REPORT OF THE INTERNATIONAL 0-GROUP FISH SURVEY IN THE BARENTS SEA AND ADJACENT WATERS IN AUGUST-SEPTEMBER 2002

The 38th annual international 0-group fish survey was carried out during the period 10 August – 8 September 2002 in the Barents Sea and adjacent waters. The following research vessels participated in the survey:

State	Vessel	Period	Research Institute
Norway	"G. O. Sars"	16.06 - 08.09	Institute of Marine Research, Bergen
Norway	"Johan Hjort"	24.08 - 08.09	Institute of Marine Research, Bergen
Russia	"AtlantNIRO"	10.08 - 08.09	The Polar Research Institute of Marine
Russia	"Fridtjof Nansen"	29.08 – 08.09	Fisheries and Oceanography, Murmansk

Names of scientists and technicians who took part on the different vessels are given in the Appendix.

Preliminary analysis of the survey data were made on board "G. O. Sars" and "AtlantNIRO" and the final report was finished by correspondence. Observations concerning the geographical distribution of 0-group fish and their abundance are given in this report together with a brief description of the hydrographical conditions in the sea.

MATERIAL AND METHODS

The geographical distributions of 0-group fish were estimated with a small mesh mid-water trawl. All vessels which participated in the survey in 2002 used the type of mid-water trawl recommended in 1980 (Anon. 1983). The standard procedure consisted of tows at 3 depths, each of 0.5 nautical miles, with the headline of the trawl located at 0, 20 and 40 m. Additional tows at 60 and 80 m, also of 0.5 nm length, were made when the 0-group fish layer was recorded deeper than 60 m or 80 m on the echo-sounder. Trawling procedure was standardised in accordance with the recommendations made in 1980. A smaller sized pelagic trawl were used during the first 20 years of the 0-group investigations. After 1985 the present gear has been used regularly. In the mid nineties Nakken and Raknes (1996) recalculated the indices from the first 20 years. Their new indices are based upon an estimate of how many 0-group cod and haddock that would have been caught if the new equipment had been used during the whole period from 1965. The indices of cod and haddock recalculated by Nakken and Raknes (1996) have been incorporated in the 0-group report since 2001.

Most of the stations were taken 35 nautical miles apart (Fig.1). Hydrographical observations were made at each trawl station and at several permanent hydrographical sections. Figs 2-4 show the temperature and salinity conditions along the hydrographical sections; Kola, Bear Island - W and Cape Kanin – N. The mean temperatures in the main parts of these sections are presented in Table 1. During the survey this year the standard section Bear Island – North Cape was not taken due to the late start of the research vessel "Fridjof Nansen". Horizontal distributions of temperature and salinities are shown for 0, 50, 100, 200 m and bottom in Figs 5-14.

Trawl stations with and without catch are indicated in the distribution charts in Figs 15 – 26, as filled and open symbols respectively. The density grading is based on catches, measured in number of fish per 1.0 nautical mile trawling. Double shading indicates dense concentrations. The criteria for discriminating between dense and scattered concentrations are the same as used in earlier reports (Anon. 1980). Abundance indices are given in Table 2. All areas based abundance indices were estimated by using standard computer programs (Fotland et al. 1995). Another set of logarithmic transformed abundance indices are given for 0-group herring, cod and haddock (Table 3), calculated according to Randa (1984). These are based on the number of fish caught during a standard trawl haul of one nautical mile. Length frequency distributions of the main species are given in Table 4.

HYDROGRAPHY

2002 seem to be a year with strong influx of warm water into the Barents Sea. The surface water temperatures were higher than the long term mean in the western and central parts of the sea, however, in the eastern part the surface temperature was on average 0.5-1.0°C lower than the long-term mean. The water temperature anomalies for depths more than 50 m were positive for the whole area except for small separate sites: next to Kolguev Island, Bear Island and in the northern part of the survey region. The bottom temperatures showed small changes compared to previous years, with a small increase in the north-western and a small decrease in south-eastern areas.

Looking at the different sections; the waters of the Bear Island-West Section had the highest positive temperature anomalies (up to +3.8°?) in the 0-50 m layer. The water temperatures of the middle and east (marine and coastal parts) branches of the Norwegian Coastal Current had temperatures 1.9, 2.0, 1.4°? above the long-term mean in the 0-50 m layer and on 1.3, 1.5, 1.4°? above the long term mean in the 0-200 m layer. Some negative anomalies were found between the west and middle branches of the Norwegian Current in the 50-100 m layer (up to –2.3°C) and

in the deep waters (deeper than 600 m) of the Middle Branch of the Norwegian Current (up to –0.8).

At the Kola section the water temperatures in the 0-50 m and 0-200 m layers exceeded the long-term mean with 1.4, 0.7°? in the Murmansk Coastal Current,1.5, 1.0°? in the Murmansk Current and 0.6, 0.5°? for the Central Branch of the North Cape Current. The waters of the Northern Branch of the North Cape Current were 1.4, 0.9°? warmer than usual in the same layers.

The waters of the Kanin Current in the Kanin Section had negative temperature anomalies (up to –2.4°?) in the 0-50 m layer except from the 20-30 m depths where positive anomalies (+1.8 - +2.3°C) were observed. The water temperature of the Novaya Zemlya Current in the 0-20 m layer was insignificantly lower than the long-term mean, however deeper than 30 m positive temperature anomalies (in average +0.5 - +1.0°?) were found. As a result the water temperatures in the whole water column of the Kanin and Novaya Zemlya currents were respectively 0.3°? lower and on 0.4°? higher than the long-term mean.

The water salinity in the survey area was close to the long-term mean. However there were some exceptions: the surface waters of the southeastern part of the Barents Sea were saltier than normally (the anomaly reached +3.3). On the contrary the surface waters close to Kanin Peninsula, southeast of Hopen Island and along the Norwegian coast were fresher than usual (the anomaly reached –1.5).

A comparison between the results from 2002 with the results from 2001 (another warm year) shows that the surface waters were colder in the eastern part of the survey area in 2002 than in the same period in 2001(on average 2.0°?). On the contrary, in the western and central parts, the surface waters were warmer (on average 1.0°?). The temperature difference between 2001 and 2002 were insignificant for the water deeper than 50 m. The surface waters along the Norwegian coast and in the northern part of the survey area were fresher than previous year, but in the central and southeastern parts they were saltier. The meteorological situation can be characterized by prevailing northeastern winds with a cooling effect for the surface waters in the eastern part of the sea. The same winds prevented the penetration of the cold air masses from Arctic Region resulting in a reduced cooling effect of the surface waters in the central and western parts.

DISTRIBUTION AND ABUNDANCE OF O-GROUP FISH AND *GONATUS FABRICII*

Compared to previous year results, 0-group cod, herring, capelin, saithe, polar cod, long rough dab and sandeel were observed in a wider area and further eastward than usual. The abundance of haddock, saith and polar cod were significantly higher than the long term mean. Cod, herring and capelin had an abundance close to the normal. The reason for the wide and eastern distribution of several species might be an intensive advection of warm Atlantic water into the Barents Sea as mentioned in the hydrography chapter. The abundance estimates for polar cod is underestimates due to incomplete coverage of their north-eastern and north-western distribution areas.

Herring (Fig.15)

0-group herring were found in a wider area than last year. Dense concentrations of 0-group herring were found in small local areas west of Spitsbergen. In addition to this a continuous

distribution of 0-group herring were found from the central to the south-eastern parts of the Barents Sea (until 45° E). The abundance index (0.53) is an increase since last year, and close to the long-term mean (Table 3). The year class can be characterised as average. The mean length of 0-group herring was 74,6 mm (Table 4), this is more than 10 mm larger than observed in 2000 and 2001. Schools of large 0-group herring with a mean total length of more than 110 mm were observed in the western part of the area, while the herring in the eastern parts were close to 70 mm.

Capelin (Fig.16)

0-group capelin were distributed in the central and eastern part of the sea, from the coast to 76º30' N and from Bear Island to the coast of Novaja Zemlja. Small scattered patches were found west off Spitsbergen. More dense concentrations were mostly located in the eastern part of the sea. The abundance index was measured to 327, somewhat above the long term mean (Table 2). The year class can be characterised as medium. The mean length (Table 4) were a few mm larger than measured last year.

Cod (Fig. 17)

Compared to the result from last year, 0-group cod were found in a much wider area in much higher densities. A larger part of the year class was distributed in the eastern part of the area than previous years. Scattered concentrations were observed from north-west off Spitsbergen to 53º E. Dense concentrations were distributed from coast to 76° N and between 23° – 48° E. The logarithmic index was 1.22 which is close to the long term mean, while the abundance index 1055 is one of the highest ever measured. The implications of this is that the 2002 year-class is widely distributed with medium abundance. The year class can be characterised as medium. The mean length of the 0-group cod is 78,5mm (Table 4) and is about 6 mm longer than what was found in 2001 and close to the long term average of 0-group cod in the Barents Sea.

Haddock (Fig. 18)

Haddock is experiencing a continuing period of high and stable recruitment. The total distribution area of 0-group haddock was slightly larger than observed last year with dense concentrations in a large area in the central part of the Barents Sea. The abundance index of 412 is the fourth largest observed. Only the indices for 1991, 1998 and 2000 are larger (Table 2). The logarithmic index of 0.99 is the second highest ever recorded. Only the 1991 index is higher. (Table 3). The length distribution and mean length of 0-group haddock are shown in Table 4. The mean length of 0-group haddock was 103,6 mm, 3,7 mm longer than previous year. The year class of haddock can be characterised as strong.

Polar cod (Fig. 19)

As in previous years, two separate areas (components) of 0-group polar cod were observed. Dense concentrations were found west and south of Spitsbergen and along the coast of Novaja Zemlja. The eastern component is by far the largest, and has increased compared to last year. The 0-group polar cod had similar distribution to what was observed in 1999 and 2000. The abundance estimates for both polar cod components are underestimates due to incomplete coverage of the northern distribution areas. Nevertheless the abundance index of both components seems to be much higher than the long-term mean. The mean length of polar cod (Table 4) is somewhat larger than last year.

Saithe (Fig. 20)

The distribution of 0-group saithe has gradually increased during the last years. Compared to the last years observation 0-group saithe were distributed on 2-3 times wider area. The saith were found from 79° N west off Spitsbergen to 52° E near the coast of Novaja Zemlja. In most of the distribution area 0-group saithe were found in scattered densities. An abundance index is calculated this year to175. It seems that the proportion of the 2002 year-class in the Barents Sea is higher then previous years and the year-class can be characterised as strong. The mean length was 81,2 mm.

Redfish (Fig. 21)

During the last years the recruitment of redfish has deteriorated. 0-group redfish were this year mainly located west off Spitsbergen. The abundance index was 28, a slight increase since last year, but still at a very low level. The mean length of 0-group redfish was 35,8 mm (Table 4), somewhat larger than what was found last year.

Greenland halibut (Fig. 22)

There is a slight increase in the abundance of 0-group Greenland halibut, which were found in two areas – to the south and to the west of Spitsbergen. The abundance index is significantly higher than the average and the highest since 1987 (Table 2). The mean length of 0-group Greenland halibut was 63,9 mm (Table 4), which is almost equal to what was found last year.

Long rough dab (Fig. 23)

0-group long rough dab were registered in three different areas. Two areas west and south of Spitsbergen and one larger one in the eastern part of the Barents Sea from 39° E to the coast of Novaja Zemlja. A significant increase in distribution was found compared to last years, and the abundance estimate of 0-group long rough dab was 173, the highest since 1994 (Table 2). The length of 0-group long rough dab was 33,0 mm, close to what was observed in 2001 (32,5mm).

Sandeel (Fig. 24)

0-group sandeel were much more abundant than previous year. The area of distribution was approximately three times as large as in 2001. The sandeel were located in the eastern part of the area between Cape Kanin and the southern coast of Novaja Zemlja. In the central part of the Barents Sea the sandeel were only found in some small areas. Mean length of 32,0 mm is much lower than what was measured in 2001 (40,6mm). No abundance index is calculated for this species.

Catfish (Fig. 25)

Scattered concentrations were found in different parts of the sea. One dense patch were observed west of Spitsbergen. Mean length of 0-group catfish was 67,7 mm. No abundance index is calculated for this species.

Gonatus (Fig. 26)

In the western parts of he investigated area 0-group *Gonatus fabricii* were found in two large areas west and south of Spitsbergen. Some scattered concentrations were found in the central parts of the Barents Sea as far east as 40° E. No abundance index is calculated for this species.

REFERENCES

Anon., 1980. Preliminary report of the International 0-group fish survey in the Barents Sea and adjacent waters in August/September 1978. *Annls biol., Copenh., 35:273-280*.

Anon., 1983. Preliminary report of the International 0-group fish survey in the Barents Sea and adjacent waters in August/September 1980. *Annls biol., Copenh., 37:259-266.*

Fotland, Å., Mehl, S. ans Sunnanå, K. 1995. Methods of index calculation and presentation of fish abundance data using standard computer programs. Pp.207-214 in Hylen, A.(ed.): *Precision and relevance of prerecruit studies for fishery management related to fish stocks in the Barents Sea and adjacent waters. Proceedings of the sixth IMR-PINRO symposium. Bergen, 14-17 June 1994*. Institute of Marine Research, Bergen; Norway.

Nakken, O. and A.Raknes 1996. Corrections of indices of abundance of 0-group fish in the Barents Sea for varying capture efficiency. *ICES CM 1996/*G:12, Ref.M.

Randa, K. 1984. Abundance and distribution of 0-grouo Arcto-Norwegian cod and haddock 1965-1982. Pp. 189-209 in Godø, O.R. and Tilseth, H. (eds): reproduction and recruitment of Arctic cod. *Proceedings of the first Soviet-Norwegian symposium; Leningrad, 26-30 September 1983*. Institute of Marine Research, Bergen; Norway.

Tereshchenko, V.V. 1992. Some results from long-term oceanographic observations during 0-group surveys in the Barents Sea. *ICES CM 1992/*C:18.

Ushakov, N.G. and Shamray E.A. 1995. The effect of different factors upon the Barents Sea capelin year-classes. Pp. 75-84 in Hylen, A. (ed): *Precision and relevance of pre-recruit studies for fishery management related to fish stocks in the Barents Sea and adjacent waters. Proceedings of the sixth IMR-PINRO symposium. Bergen, 14-17 June 1994.* Institute of Marine Research, Bergen, Norway.

Table 1. Mean water temperature[1] in main parts of standard sections in the Barents Sea and adjacent waters in August-September 1965-2002.

Year	Section[2] and layer (depth in meters)						
	1	2	3	4	5	6	7
	0-50	50-200	0-200	0-bot.	0-bot.	0-200	0-200
1965	6.7	3.9	4.6	4.6	3.7	5.1	-
1966	6.7	2.6	3.6	1.9	2.2	5.5	3.6
1967	7.5	4.0	4.9	6.1	3.4	5.6	4.2
1968	6.4	3.7	4.4	4.7	2.8	5.4	4.0
1969	6.7	3.1	4.0	2.6	2.0	6.0	4.2
1970	7.8	3.7	4.7	4.0	3.3	6.1	-
1971	7.1	3.2	4.2	4.0	3.2	5.7	4.2
1972	8.7	4.0	5.2	5.1	4.1	6.3	3.9
1973	7.7	4.5	5.3	5.7	4.2	5.9	5.0
1974	8.1	3.9	4.9	4.6	3.5	6.1	4.9
1975	7.0	4.6	5.2	5.6	3.6	5.7	4.9
1976	8.1	4.0	5.0	4.9	4.4	5.6	4.8
1977	6.9	3.4	4.3	4.1	2.9	4.9	4.0
1978	6.6	2.5	3.6	2.4	1.7	5.0	4.1
1979	6.5	2.9	3.8	2.0	1.4	5.3	4.4
1980	7.4	3.5	4.5	3.3	3.0	5.7	4.9
1981	6.6	2.7	3.7	2.7	2.2	5.3	4.4
1982	7.1	4.0	4.8	4.5	2.8	5.8	4.9
1983	8.1	4.8	5.6	5.1	4.2	6.3	5.1
1984	7.7	4.1	5.0	4.5	3.6	5.9	5.0
1985	7.1	3.5	4.4	3.4	3.4	5.3	4.6
1986	7.5	3.5	4.5	3.9	3.2	5.8	4.4
1987	6.2	3.3	4.0	2.7	2.5	5.2	3.9
1988	7.0	3.7	4.5	3.8	2.9	5.5	4.2
1989	8.6	4.8	5.8	6.5	4.3	6.9	4.9
1990	8.1	4.4	5.3	5.0	3.9	6.3	5.7
1991	7.7	4.5	5.3	4.8	4.2	6.0	5.4
1992	7.5	4.6	5.3	5.0	4.0	6.1	5.0
1993	7.5	4.0	4.9	4.4	3.4	5.8	5.4
1994	7.7	3.9	4.8	4.6	3.4	6.4	5.3
1995	7.6	4.9	5.6	5.9	4.3	6.1	5.2
1996	7.6	3.7	4.7	5.2	2.9	5.8	4.7
1997	7.3	3.4	4.4	4.2	2.8	5.6	4.1
1998	8.4	3.4	4.7	2.1	1.9	6.0	[3])
1999	7.4	3.8	4.7	3.8	3.1	6.2	5.3
2000	7.6	4.5	5.3	5.8	4.1	5.7	5.1
2001	6.9	4.0	4.7	5.6	4.0	5.7	4.9
2002	8.6	4.8	5.8	4.0	3.7	-	5.4
Average 1965-2002	7.4	3.8	4.7	4.3	3.3	5.8	4.7

[1]) Earlier presented temperatures have been slightly adjusted (Tereshchenko, 1992).

[2]) 1-3: Murmansk Current; Kola section (70º30'N-72º30'N, 33º30'E)
4: Cape Kanin section (68º45'N-70º05'N, 43º15'E)
5: Cape Kanin section (71º00'N-72º00'N, 43º15'E)
6: North Cape Current; North Cape-Bear Island section (71º33'N, 25º02'E – 73º35'N, 20º46'E)
7: West Spitsbergen Current; Bear Island – West section (74º30'N 06º34'E – 15º55'E).

[3]) In 1998 only the central branch and the eastern branch of the West Spitsbergen Current were covered, and the temperatures were 5.4 and 4.5ºC respectively.

Table 2. Abundance indices of 0-group fish in the Barents Sea and adjacent waters in 1965-2002

Year	Capelin[1]	Cod[2]	Haddock[2]	Polar cod		Redfish	Greenland halibut	Long rough dab
				West	East			
1965	37	11	13	0		159		66
1966	119	2	2	129		236		97
1967	89	62	76	165		44		73
1968	99	45	14	60		21		17
1969	109	211	186	208		295		26
1970	51	1097	208	197		247	1	12
1971	151	356	166	181		172	1	81
1972	275	225	74	140		177	8	65
1973	125	1101	87	26		385	3	67
1974	359	82	237	227		468	13	93
1975	320	453	224	75		315	21	113
1976	281	57	148	131		447	16	96
1977	194	279	187	157	70	472	9	72
1978	40	192	110	107	144	460	35	76
1979	660	129	95	23	302	980	22	69
1980	502	61	68	79	247	651	12	108
1981	570	65	30	149	93	861	38	95
1982	393	136	107	14	50	694	17	150
1983	589	459	219	48	39	851	16	80
1984	320	559	293	115	16	732	40	70
1985	110	742	156	60	334	795	36	86
1986	125	434	160	111	366	702	55	755
1987	55	102	72	17	155	631	41	174
1988	187	133	86	144	120	949	8	72
1989	1300	202	112	206	41	698	5	92
1990	324	465	227	144	48	670	2	35
1991	241	766	472	90	239	200	1	28
1992	26	1159	313	195	118	150	3	32
1993	43	910	240	171	156	162	11	55
1994	58	899	282	50	448	414	20	272
1995	43	1069	148	6	0	220	15	66
1996	291	1142	196	59	484	19	5	10
1997	522	1077	150	129	453	50	13	42
1998	428	576	593	144	457	78	11	28
1999	722	194	184	116	696	27	13	66
2000	303	870	417	76	387	195	28	81
2001	221	212	394	148	146	11	32	86
2002	327	1055	412	179	588	28	34	173
1985-2002	296	667	256	114	291	333	19	120
1965-2002	279	463	188			386	18	97

[1]) Assessment for 1965-1978 in Anon. 1980 and for 1979-1993 in Ushakov and Shamray 1995

[2]) Indices for 1965-1985 for cod and haddock adjusted according to Nakken and Raknes (1996)

Table 3. Estimated logarithmic indices with 90% confidence limits of year-class abundance for 0-group herring, cod and haddock in the Barents Sea and adjacent waters 1966-2002.

Year	Herring			Cod			Haddock		
	Index	Confidence limits		Index	Confidence limits		Index	Confidence limits	
1966	0.14	0.04	0.31	0.02	0.01	0.04	0.01	0.00	0.03
1967	0.00	-	-	0.04	0.02	0.08	0.08	0.03	0.13
1968	0.00	-	-	0.02	0.01	0.04	0.00	0.00	0.02
1969	0.01	0.00	0.04	0.25	0.17	0.34	0.29	0.20	0.41
1970	0.00	-	-	2.51	2.02	3.05	0.64	0.42	0.91
1971	0.00	-	-	0.77	0.48	1.01	0.26	0.18	0.36
1972	0.00	-	-	0.52	0.35	0.72	0.16	0.09	0.27
1973	0.05	0.03	0.08	1.48	1.18	1.82	0.26	0.15	0.40
1974	0.01	0.01	0.01	0.29	0.18	0.42	0.51	0.39	0.68
1975	0.00	-	-	0.90	0.66	1.17	0.60	0.40	0.85
1976	0.00	-	-	0.13	0.06	0.22	0.38	0.24	0.51
1977	0.01	0.00	0.03	0.49	0.36	0.65	0.33	0.21	0.48
1978	0.02	0.01	0.05	0.22	0.14	0.32	0.12	0.07	0.19
1979	0.09	0.01	0.20	0.40	0.25	0.59	0.20	0.12	0.28
1980	-	-	-	0.13	0.08	0.18	0.15	0.10	0.20
1981	0.00	-	-	0.10	0.06	0.18	0.03	0.00	0.05
1982	0.00	-	-	0.59	0.61	0.77	0.38	0.30	0.52
1983	1.77	1.29	2.33	1.69	1.34	2.08	0.62	0.48	0.77
1984	0.34	0.20	0.52	1.55	1.18	1.98	0.78	0.60	0.99
1985	0.23	0.18	0.28	2.46	2.22	2.71	0.27	0.23	0.31
1986	0.00	-	-	1.37	1.06	1.70	0.39	0.28	0.52
1987	0.00	0.00	0.03	0.17	0.01	0.40	0.10	0.00	0.25
1988	0.32	0.16	0.53	0.33	0.22	0.47	0.13	0.05	0.34
1989	0.59	0.49	0.76	0.38	0.30	0.48	0.14	0.10	0.20
1990	0.31	0.16	0.50	1.23	1.04	1.34	0.61	0.48	0.75
1991	1.19	0.90	1.52	2.30	1.97	2.37	1.17	0.98	1.37
1992	1.06	0.69	1.50	2.94	2.53	3.39	0.87	0.71	1.06
1993	0.75	0.45	1.14	2.09	1.70	2.51	0.64	0.48	0.82
1994	0.28	0.17	0.42	2.27	1.83	2.76	0.64	0.49	0.81
1995	0.16	0.07	0.29	2.40	1.97	2.88	0.25	0.13	0.41
1996	0.65	0.47	0.85	2.87	2.53	3.24	0.39	0.25	0.56
1997	0.39	0.25	0.54	1.60	1.35	1.86	0.21	0.12	0.31
1998	0.59	0.40	0.82	0.68	0.48	0.91	0.59	0.44	0.76
1999	0.41	0.25	0.59	0.21	0.11	0.34	0.25	0.11	0.44
2000	0.30	0.17	0.46	1.49	1.21	1.78	0.64	0.46	0.84
2001	0.13	0.04	0.25	0.23	0.12	0.36	0.67	0.52	0.84
2002	0.53	0.36	0.73	1.22	0.97	1.50	0.99	0.75	1.25
Mean 1985-2002	0.44			1.46			0.50		

Table 4. Length distribution 0-group fish in the Barents Sea and adjacent waters in August-September 2002, %

Length, cm	Herring	Capelin	Cod	Haddock	Polar Cod	Red fish	Sandeel	Green land halibut	Long rough dab
1.0-1.4									
1.5-1.9							0.14		0.42
2.0-2.4		0.09			0.63	11.84	1.23	0.35	5.86
2.5-2.9		1.28			5.99	1.94	26.34	1.4	22.01
3.0-3.4		13.68			20.11	15.67	55.80	2.45	34.14
3.5-3.9		15.65	0.02	0.08	28.60	41.08	13.74	3.5	31.64
4.0-4.4	0.12	21.04	0.16	0.04	25.45	27.31	2.62	0.7	5.43
4.5-4.9	0.94	12.90	0.22	0.13	13.23	2.16	0.04	2.62	0.43
5.0-5.4	8.08	9.65	0.93	0.91	4.80		0.01	2.27	0.04
5.5-5.9	20.15	4.25	2.58	1.11	0.96			1.57	0.03
6.0-6.4	15.92	5.78	6.41	3.49	0.25		0.01	22.98	
6.5-6.9	10.31	6.98	10.86	2.52			0.01	34.12	
7.0-7.4	5.55	6.92	17.45	4.48			0.01	22.63	
7.5-7.9	3.91	1.28	18.58	4.49			0.02	2.8	
8.0-8.4	5.49	0.40	16.56	5.20			0.01	1.57	
8.5-8.9	5.40	0.09	11.55	3.67				1.05	
9.0-9.4	5.06		7.72	4.27			0.02		
9.5-9.9	4.40		3.41	8.61			0.01		
10.0-10.4	4.32		1.86	7.91					
10.5-10.9	3.51		1.40	11.24					
11.0-11.4	3.61		0.16	11.11					
11.5-11.9	2.04		0.02	8.42					
12.0-12.4	1.02		0.08	7.87					
12.5-12.9	0.17			6.83					
13.0-13.4			0.01	3.90					
13.5-13.9				2.34					
14.0-14.4				1.38					
Tot catch	87184	89450	86354	8315	576942	163	13810	280	3282
Mean L (mm)	74.6	48.0	78.5	103.6	39.4	35.8	32.0	63.9	33.0

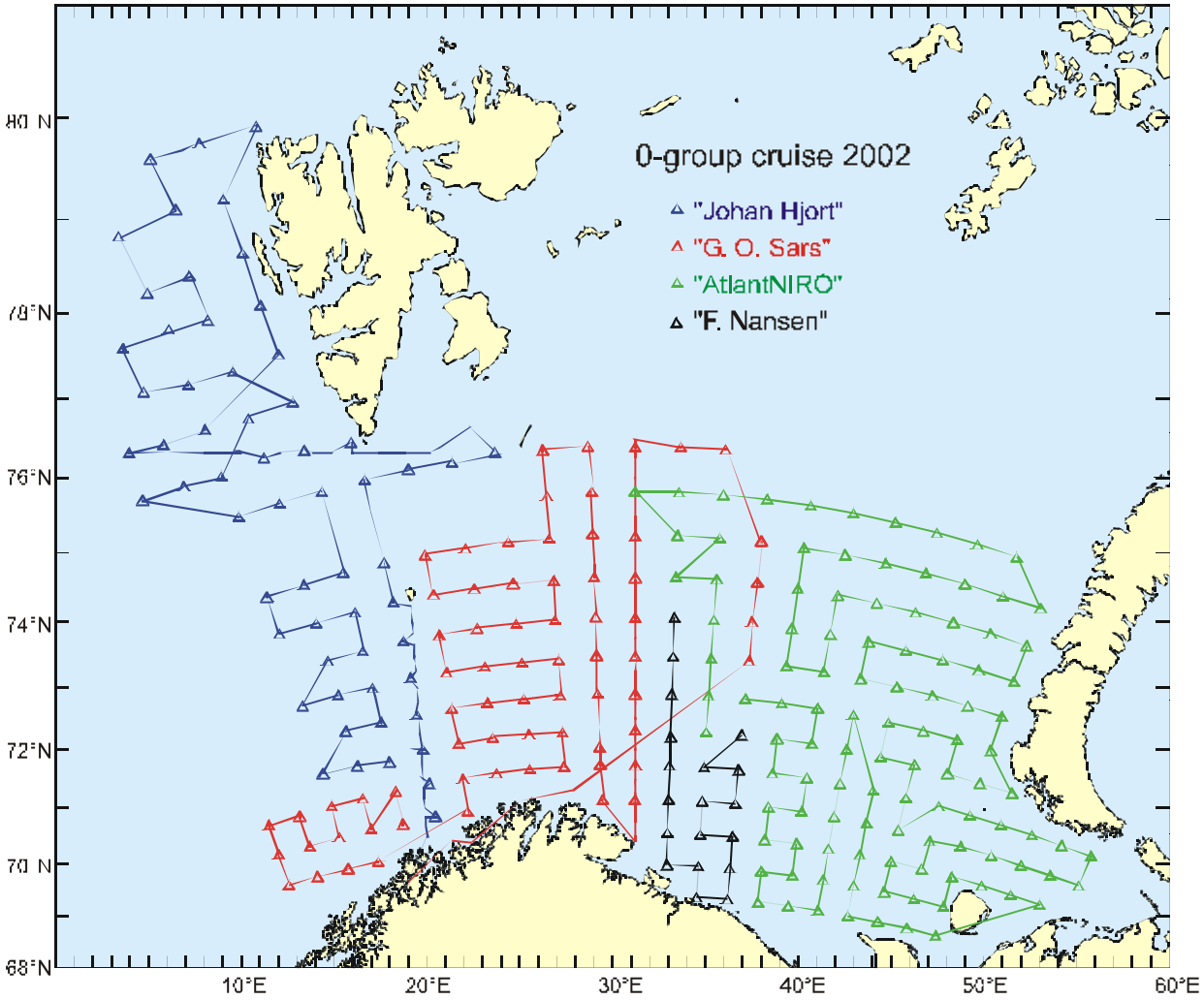

Fig.1. Trawl stations taken under the 0-group investigations in 2002

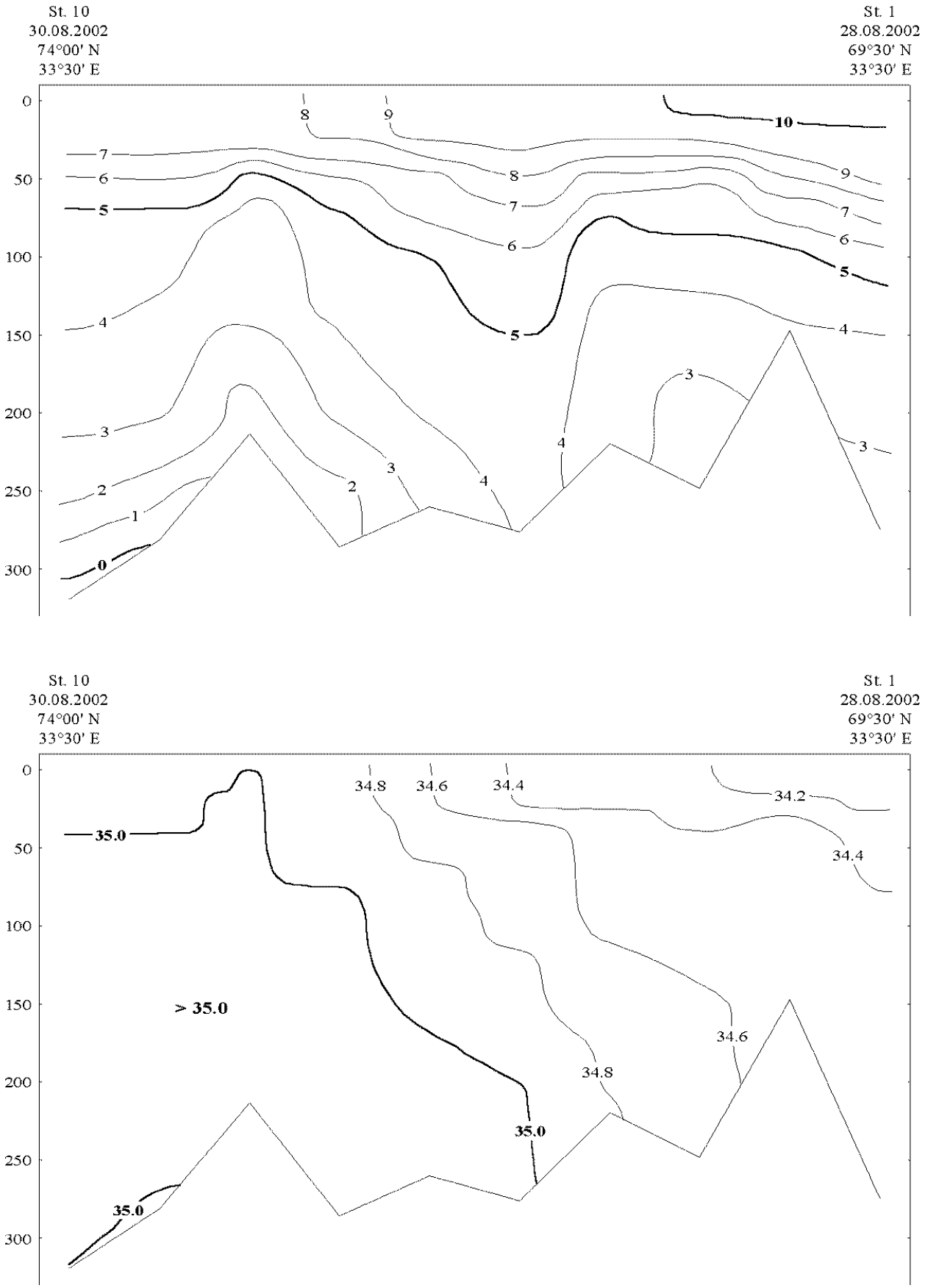

Fig.2. Temperature and salinity on the Kola section

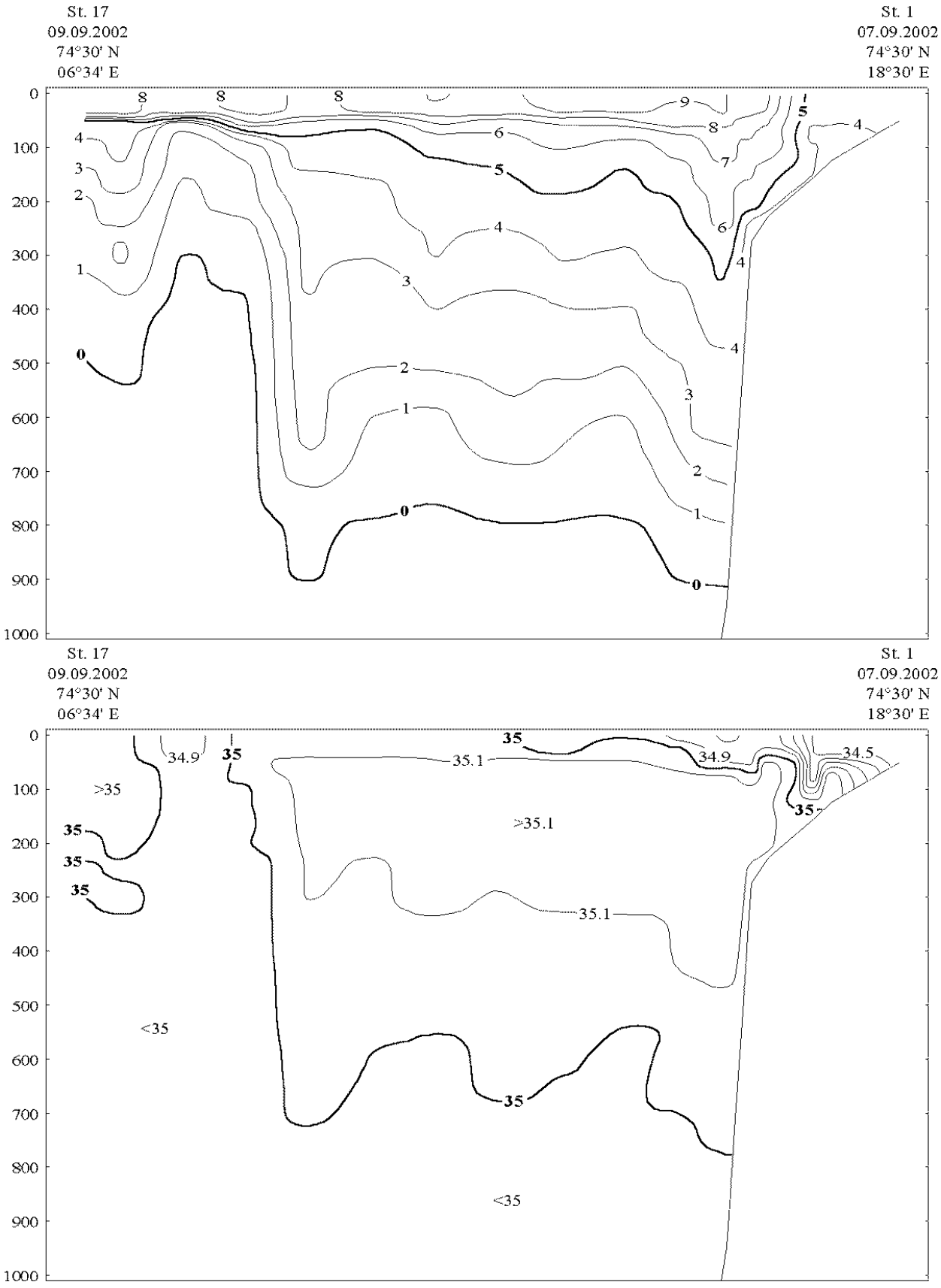

Fig.3. Temperature and salinity on the Bear Island-W section

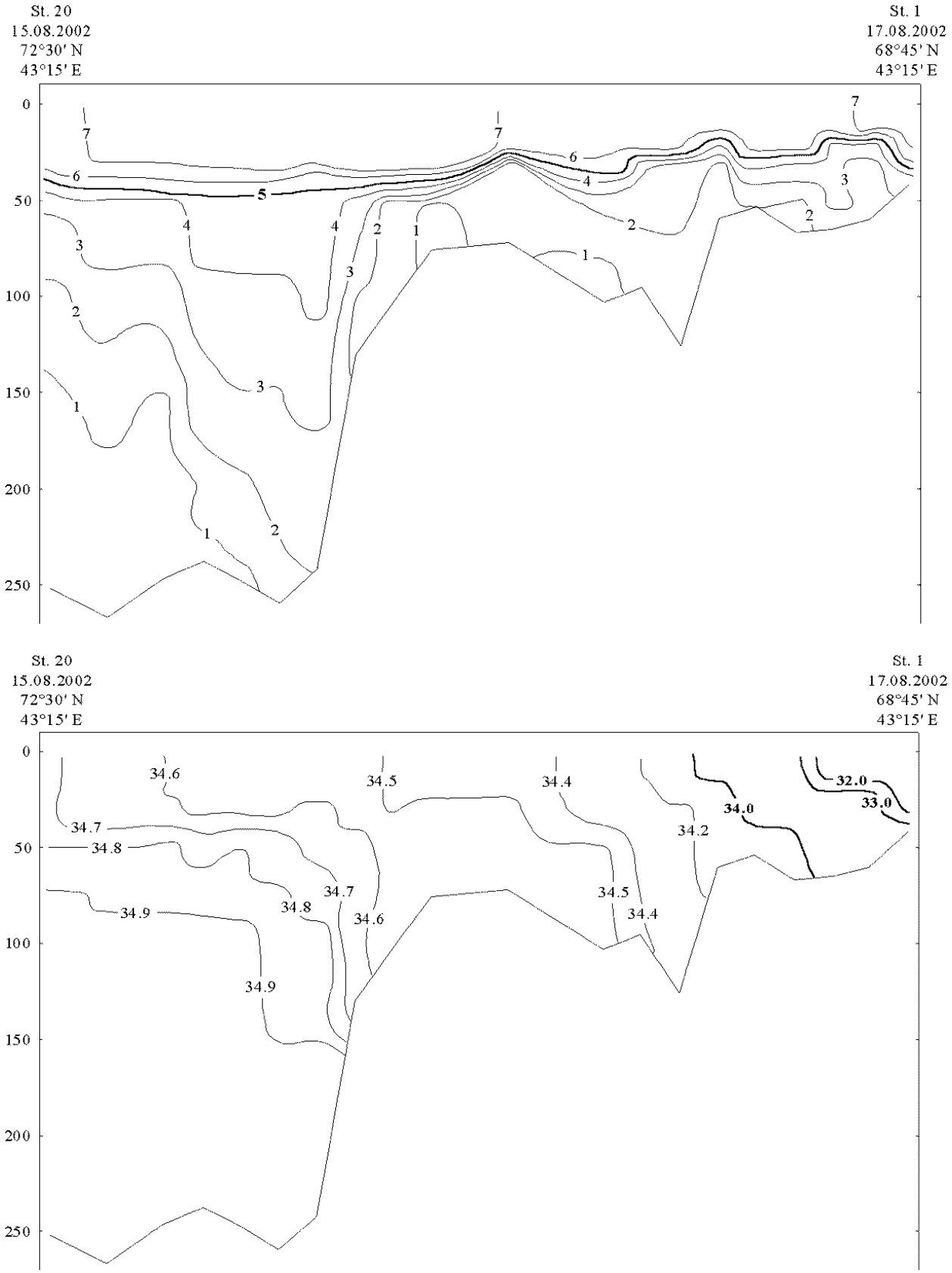

Fig.4. Temperature and salinity on the Kanin section

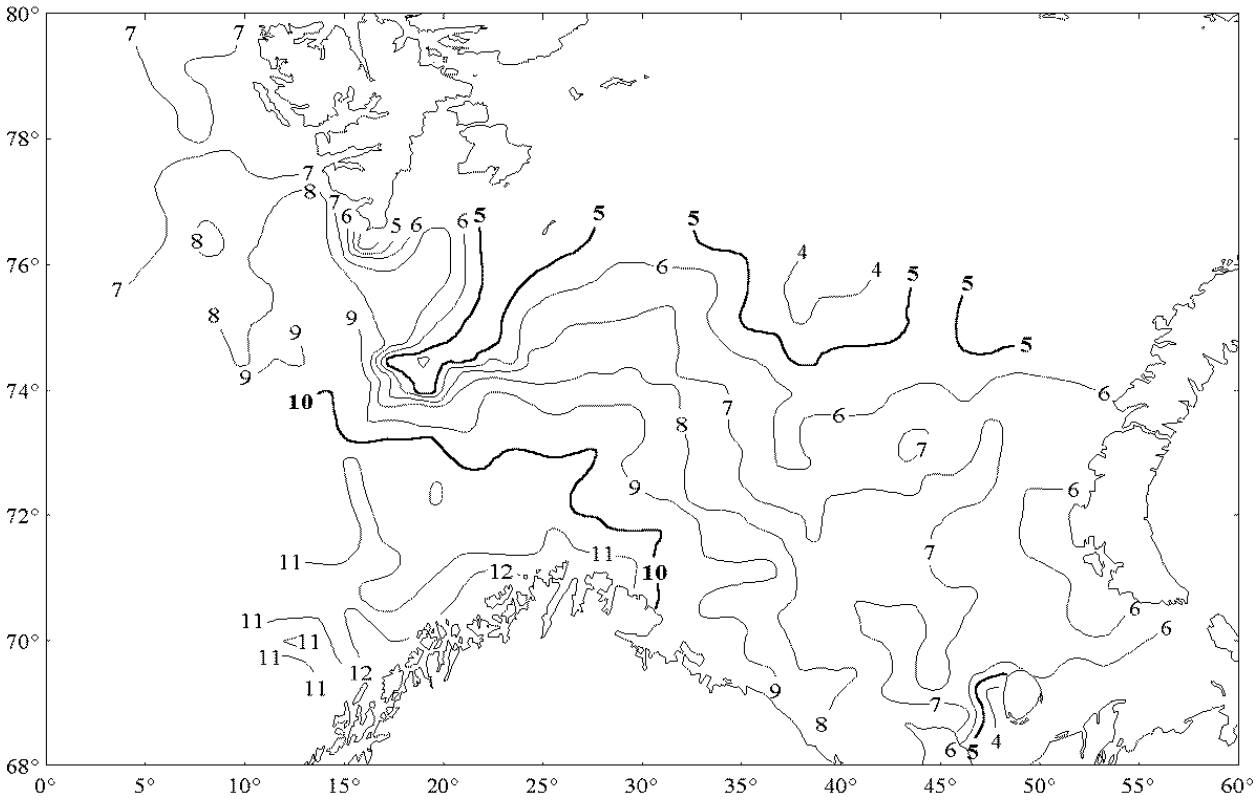

Fig.5. Distribution of surface temperature (^{0}C)

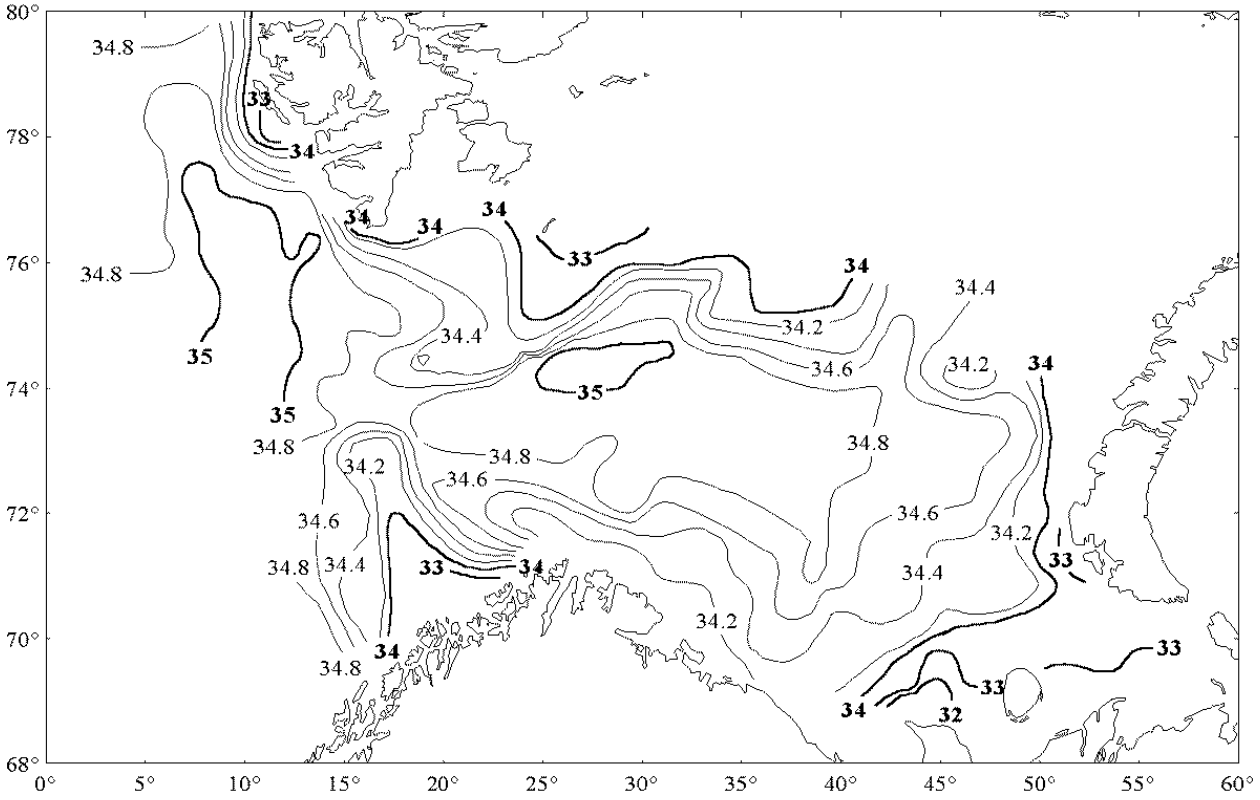

Fig.6. Distribution of surface salinity

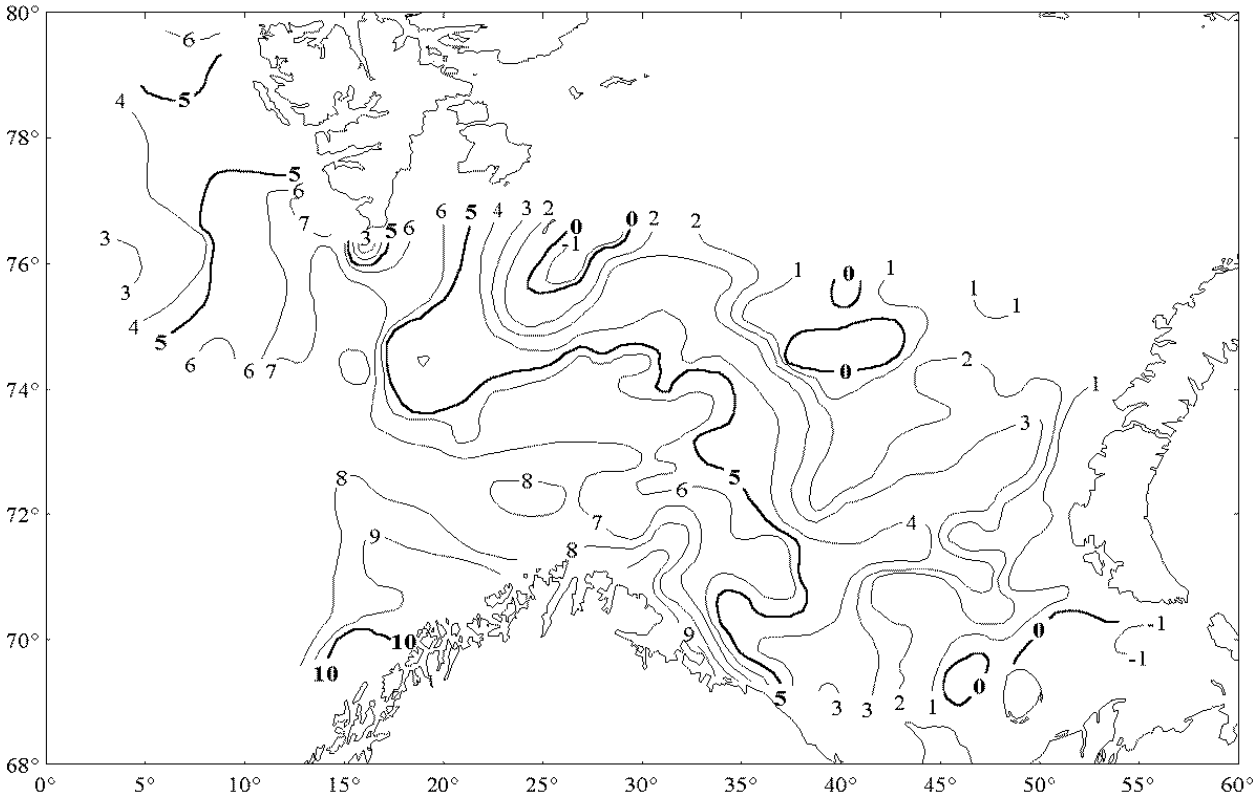

Fig.7. Distribution of temperature (^{0}C) in 50 m depth

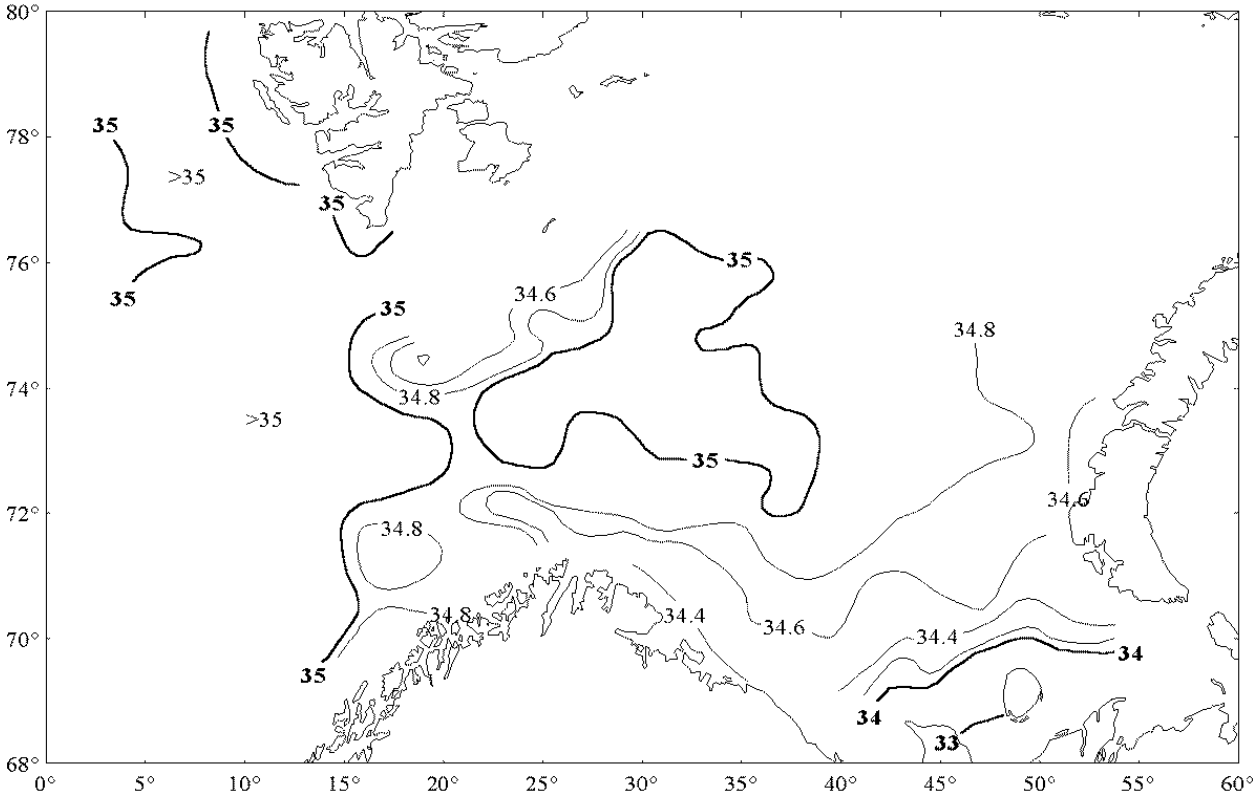

Fig.8. Distribution of salinity in 50 m depth

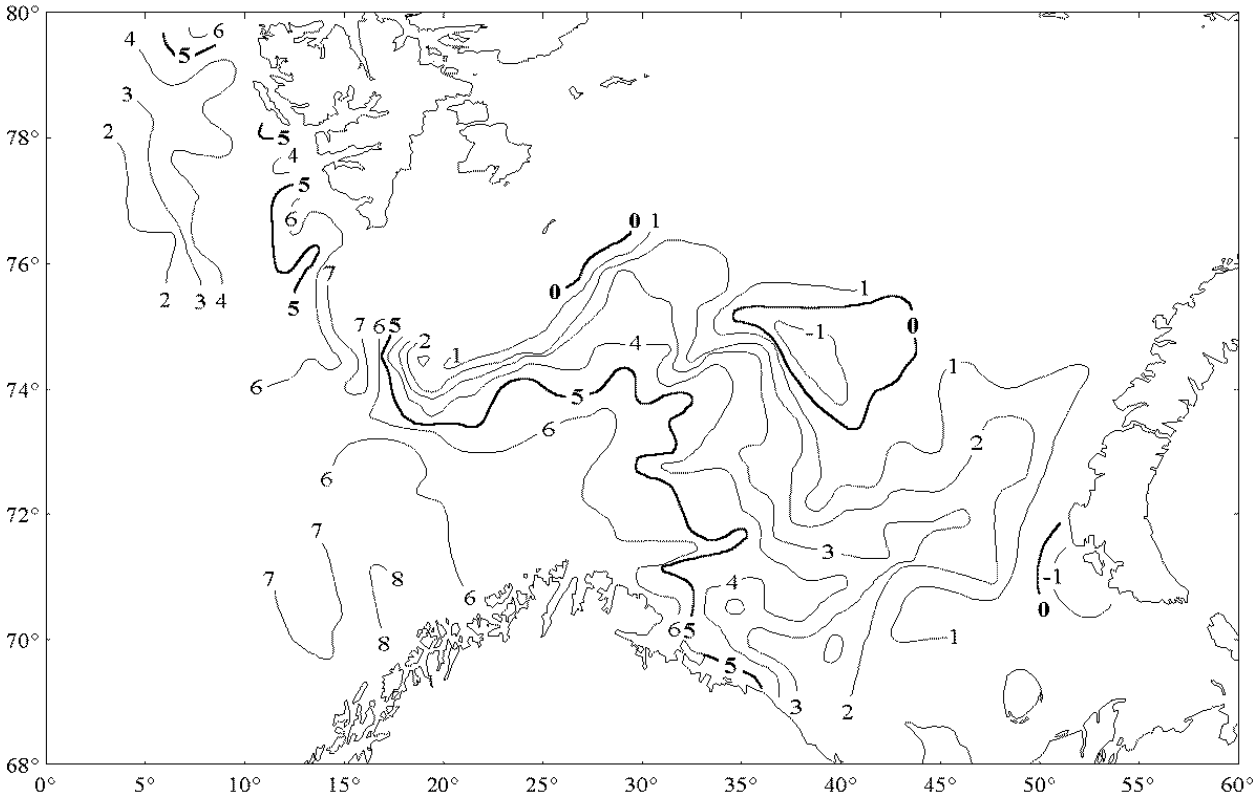

Fig.9. Distribution of temperature (^{0}C) in 100 m depth

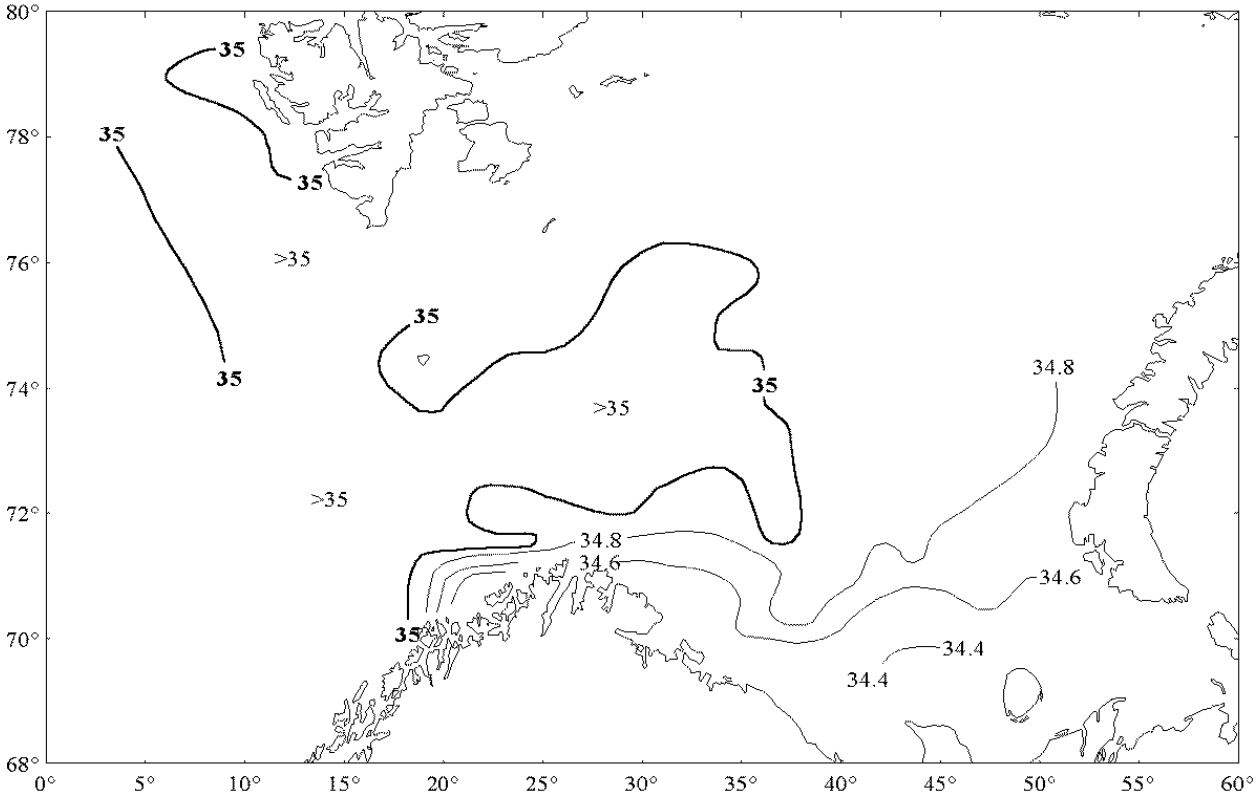

Fig.10. Distribution of salinity in 100 m depth

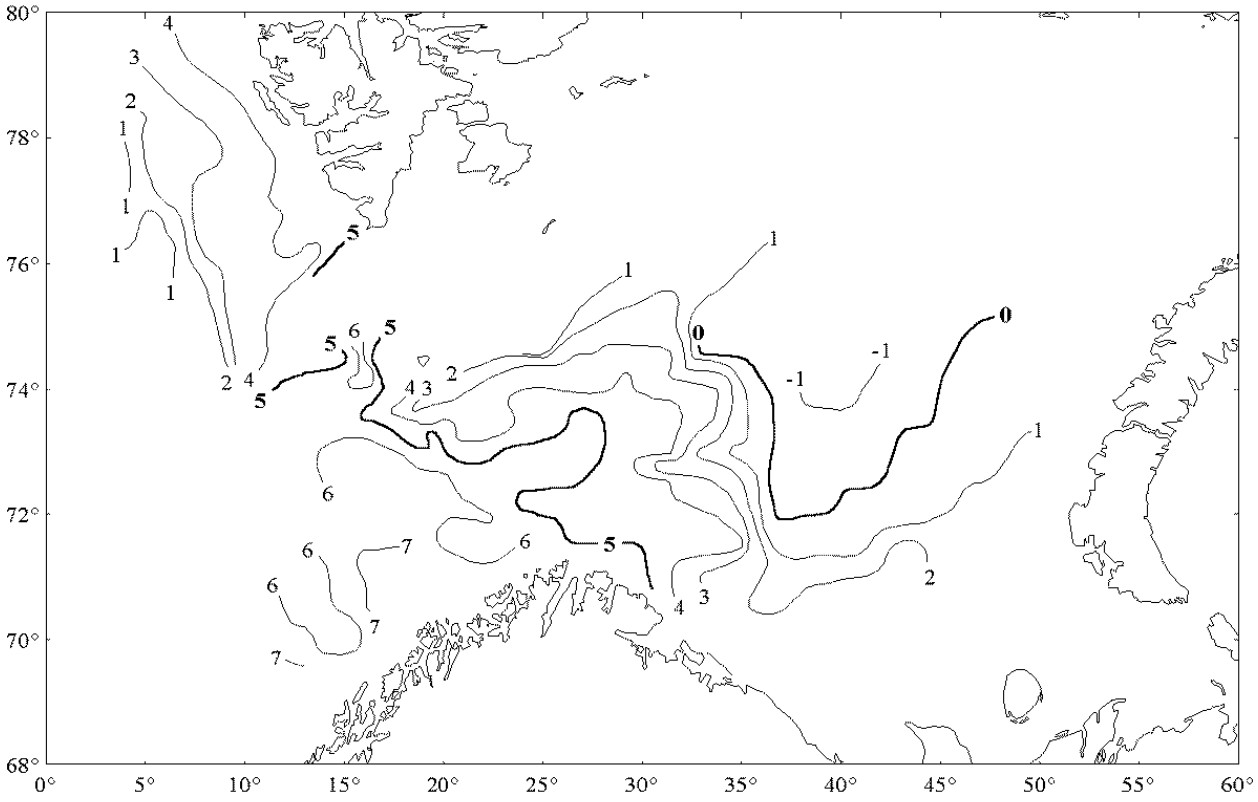

Fig.11. Distribution of temperature (^{0}C) in 200 m depth

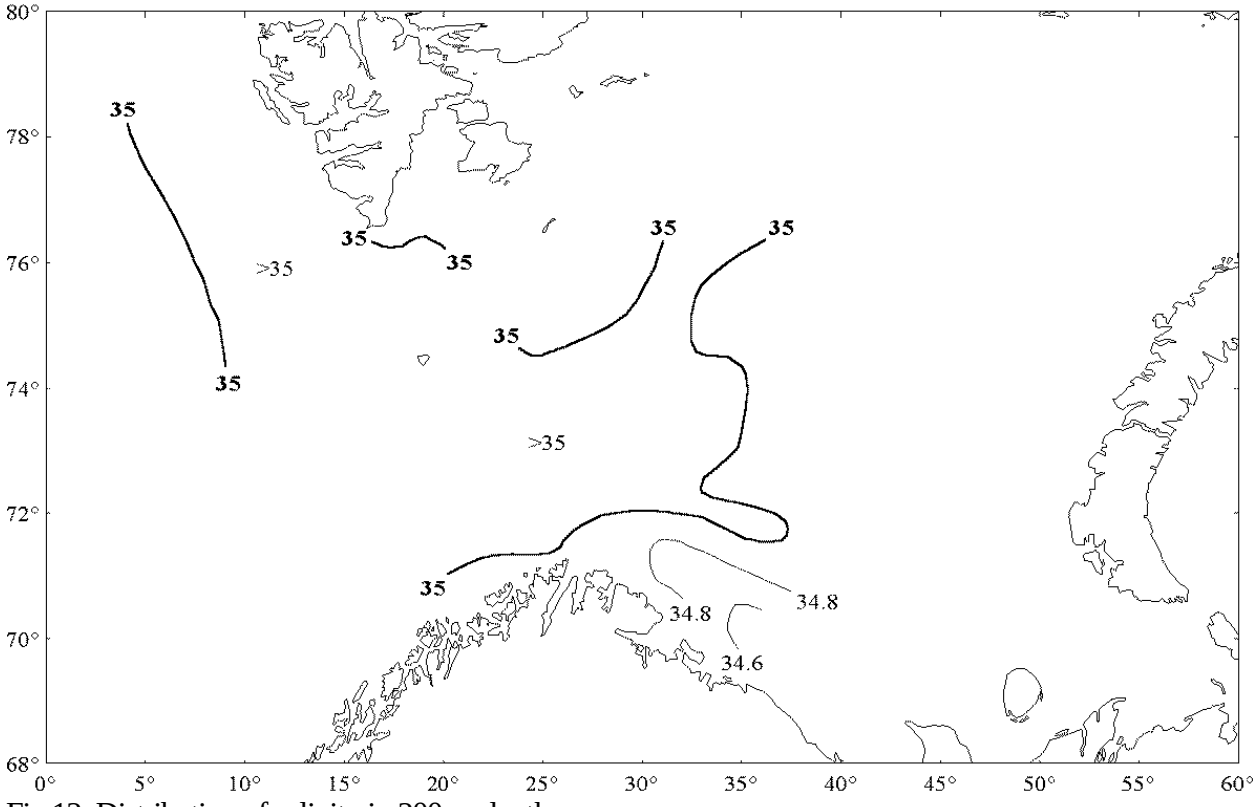

Fig.12. Distribution of salinity in 200 m depth

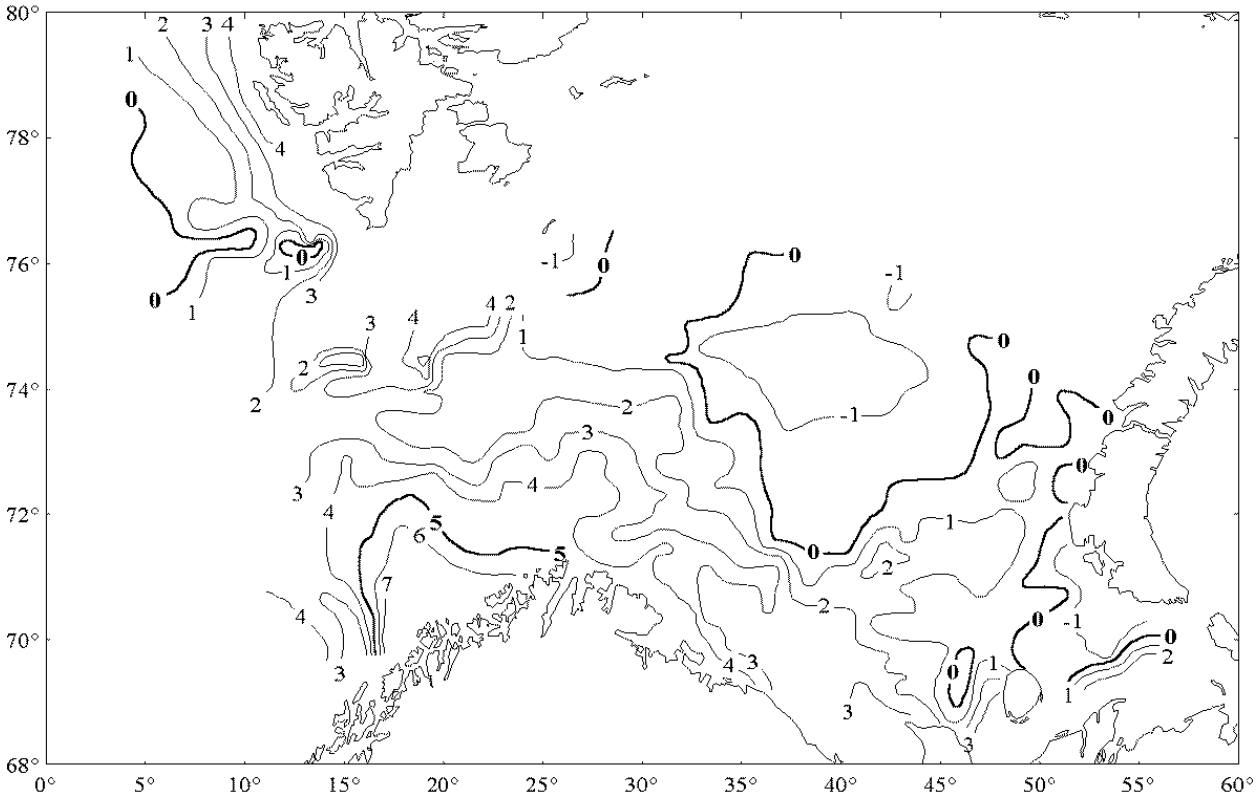

Fig.13. Distribution of bottom temperature (^{0}C)

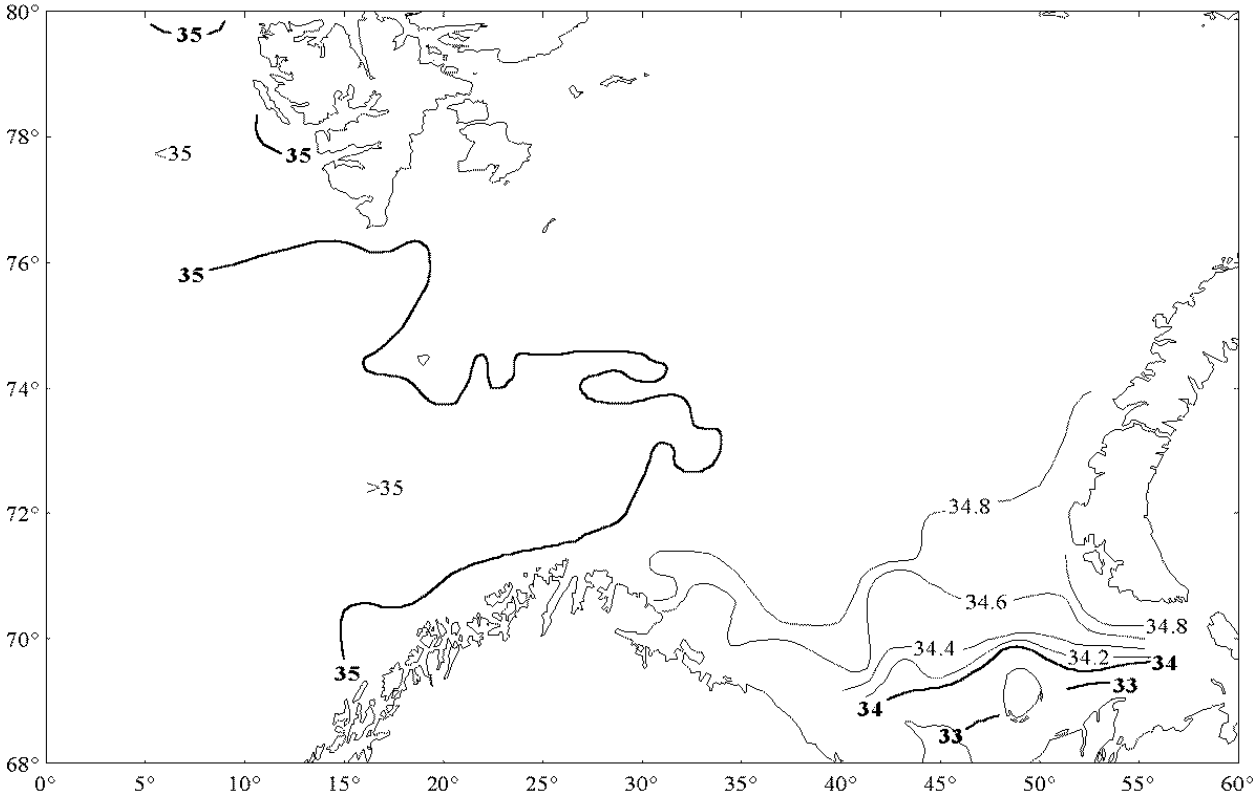

Fig.14.Distribution of bottom salinity

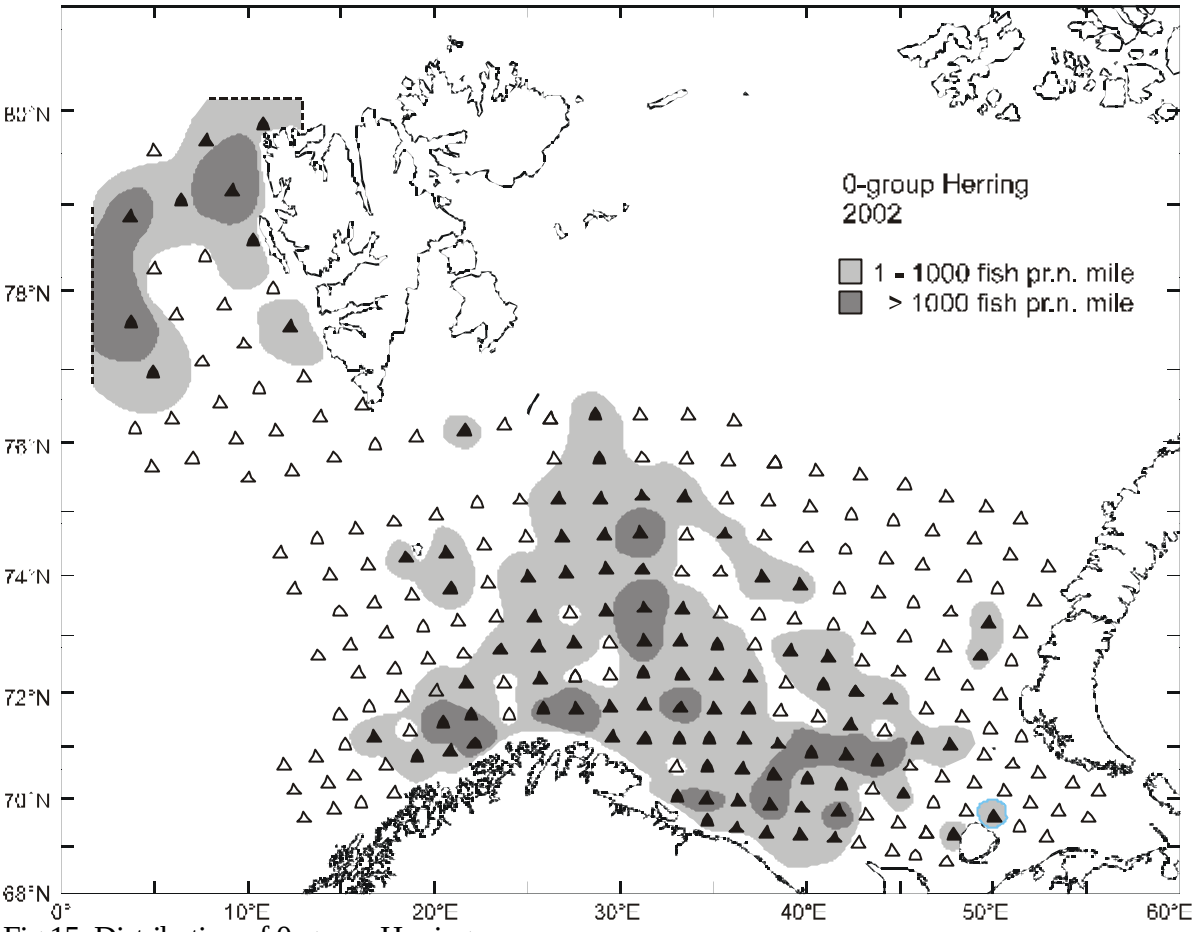

Fig.15. Distribution of 0-group Herring

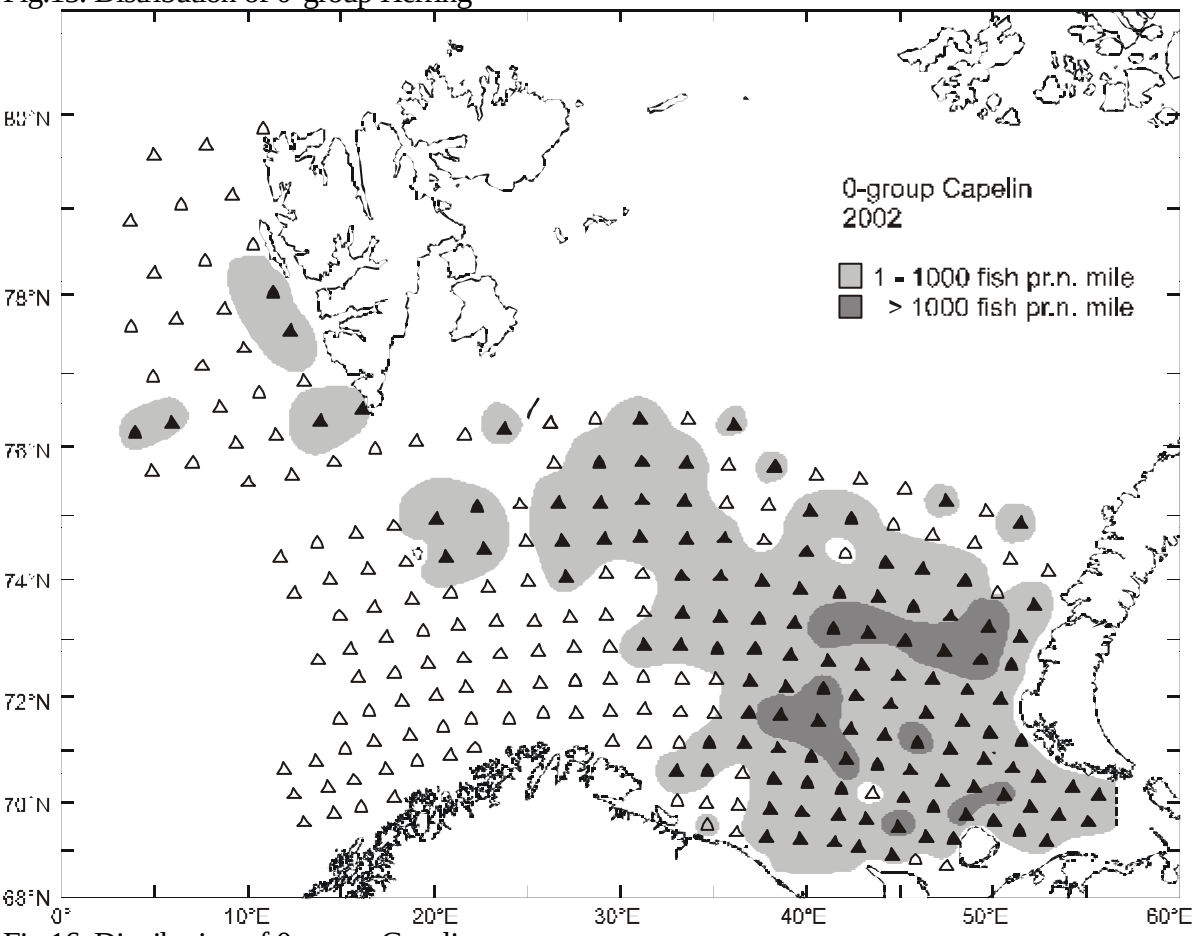

Fig.16. Distribution of 0-group Capelin

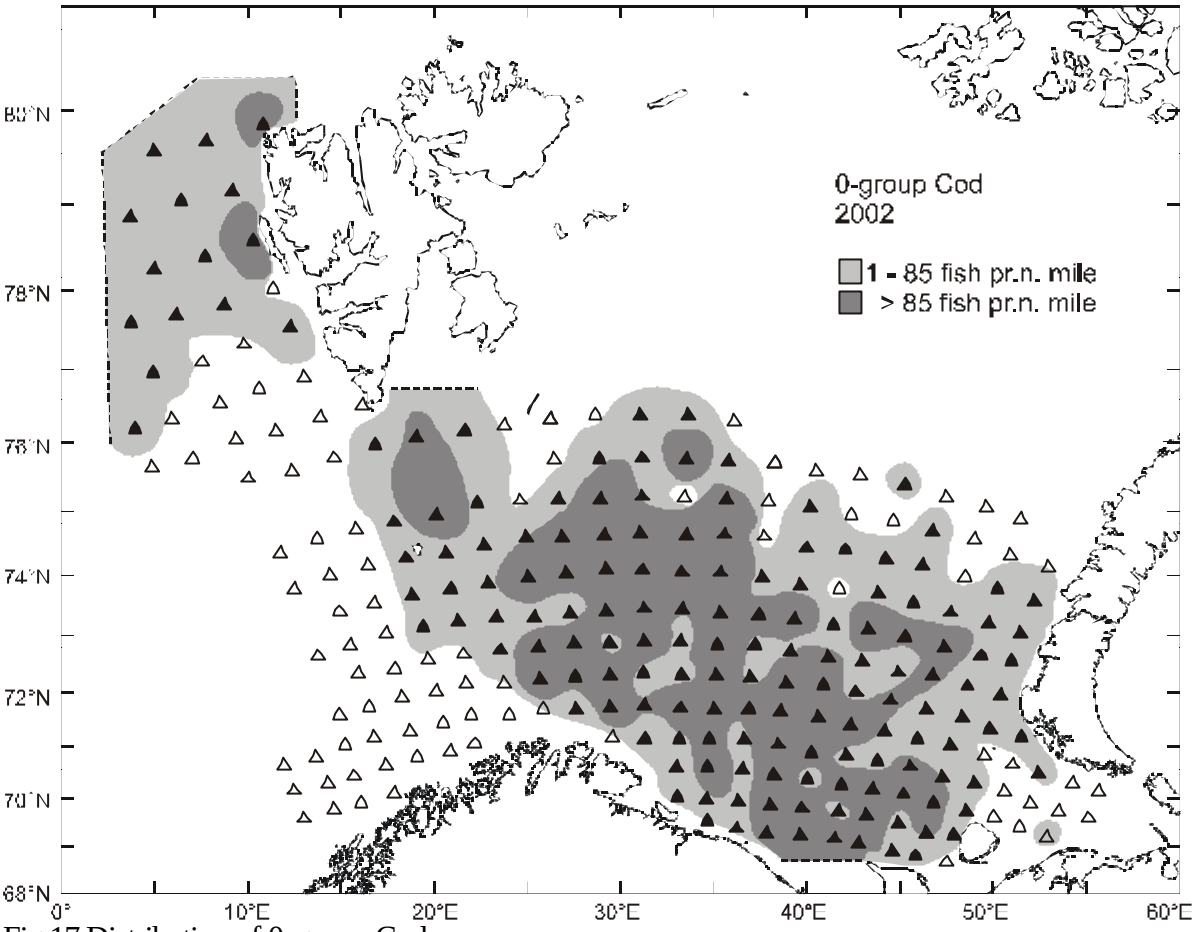

Fig.17.Distribution of 0-group Cod

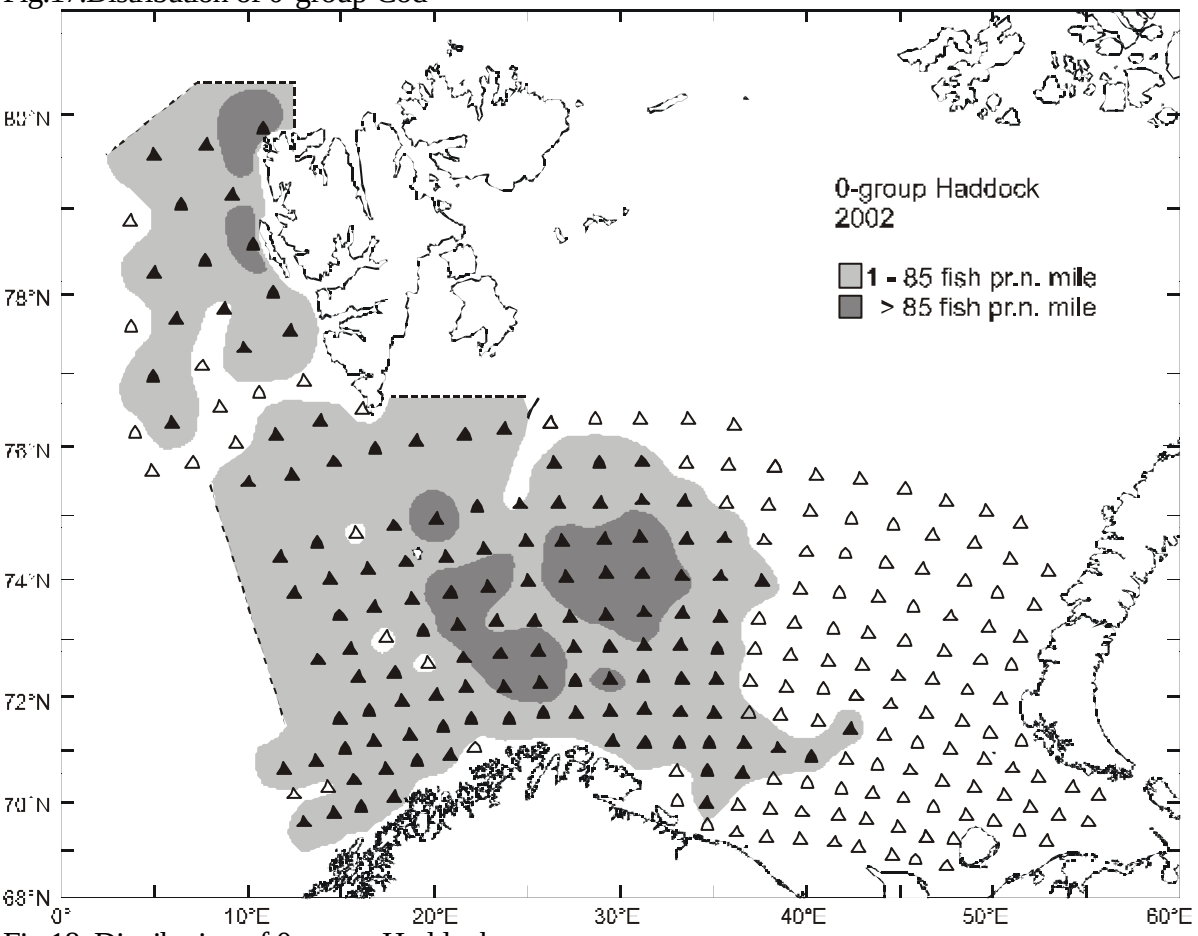

Fig.18. Distribution of 0-group Haddock

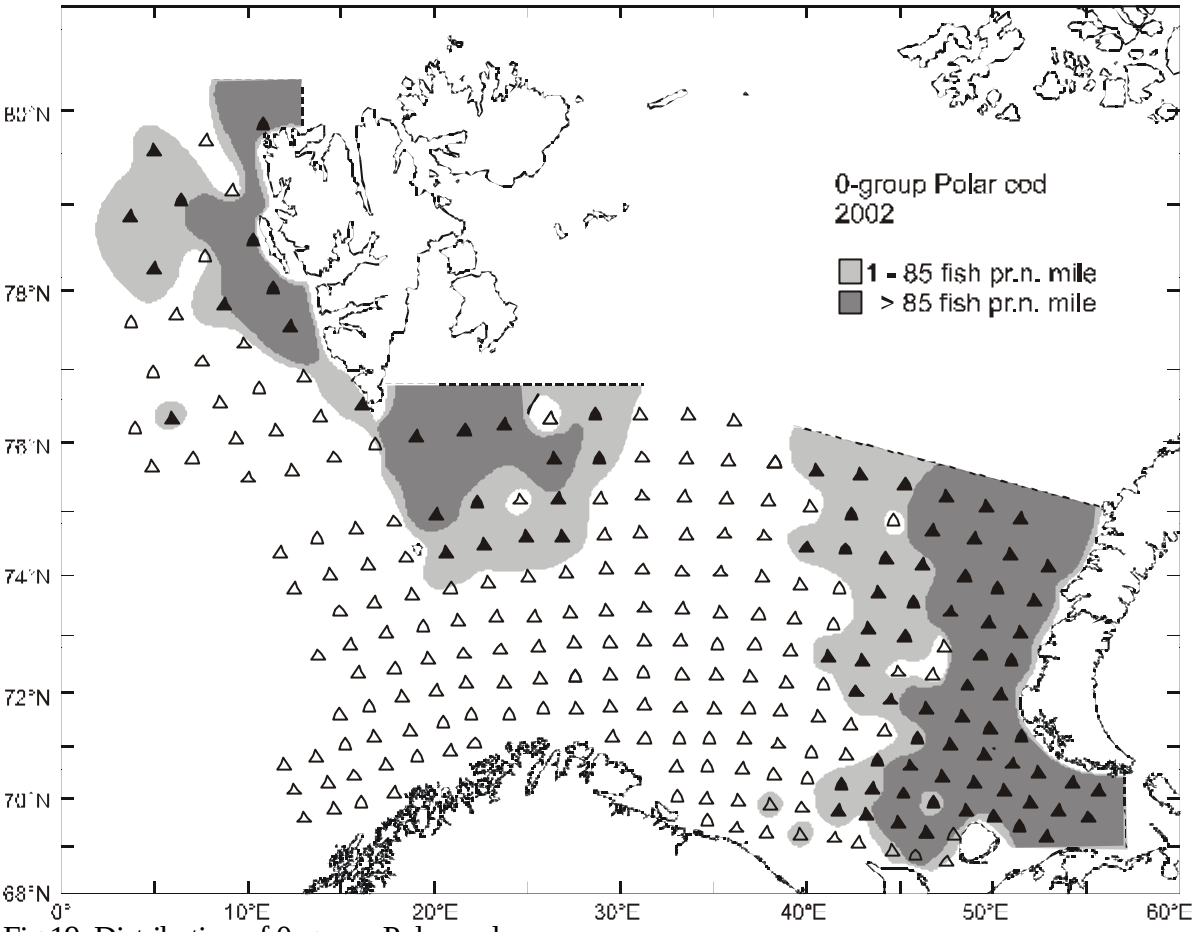

Fig.19. Distribution of 0-group Polar cod

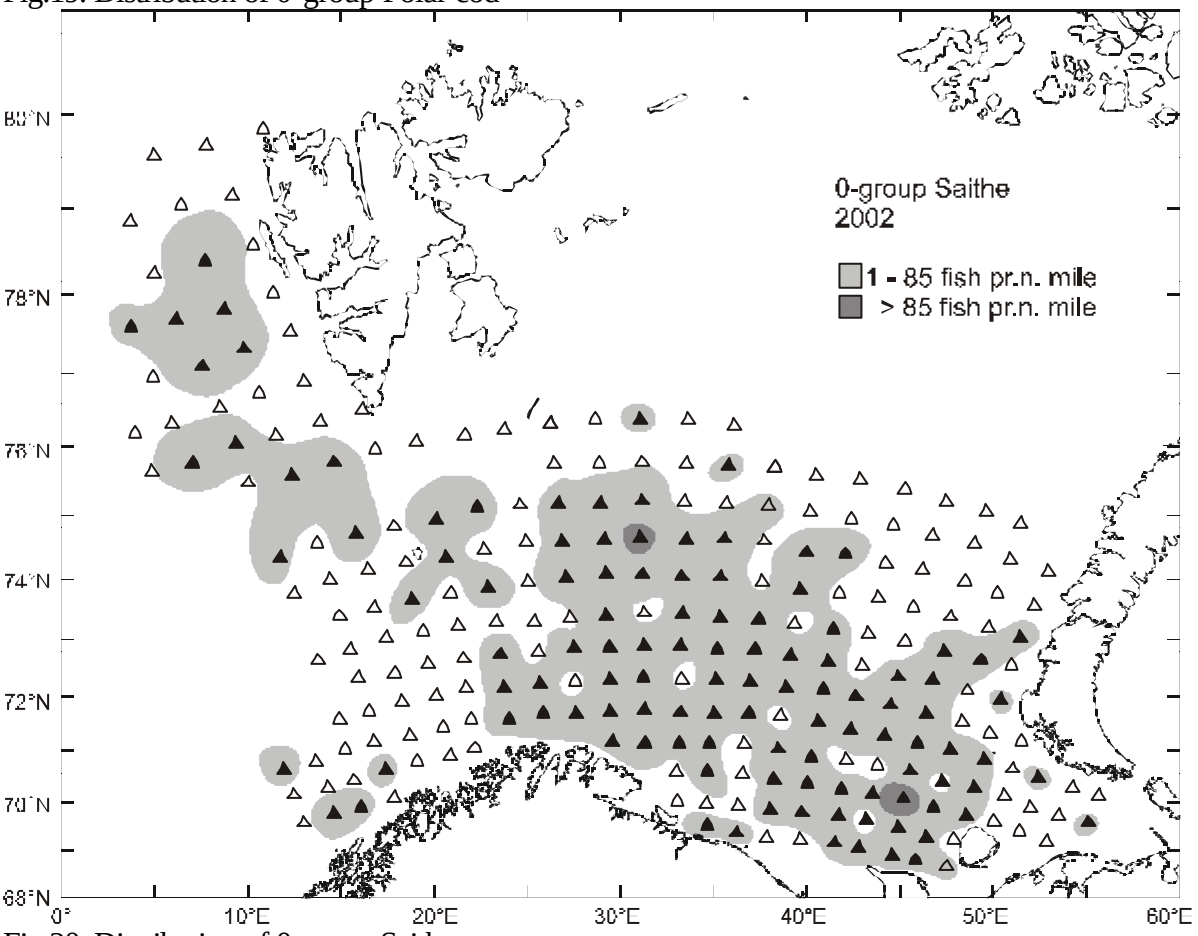

Fig.20. Distribution of 0-group Saithe

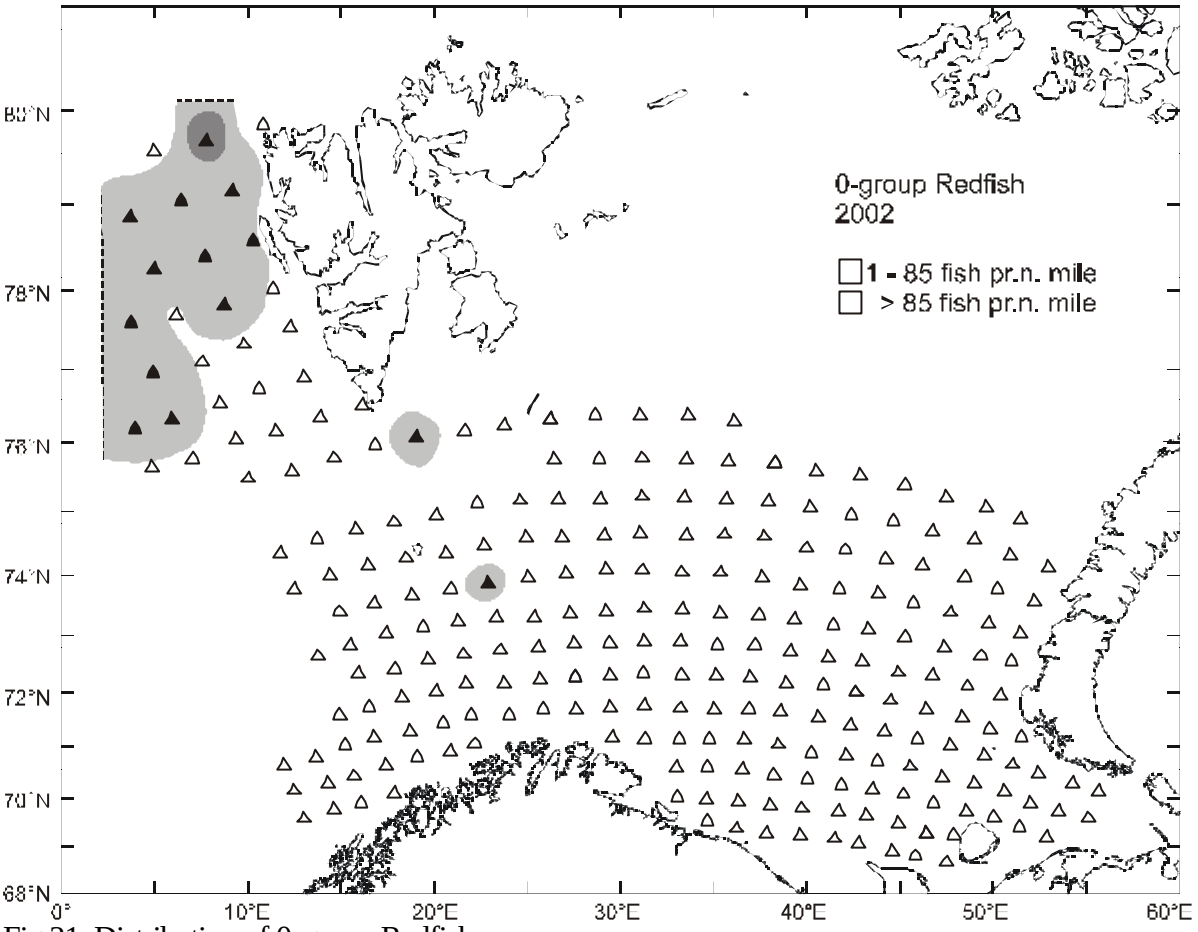

Fig.21. Distribution of 0-group Redfish

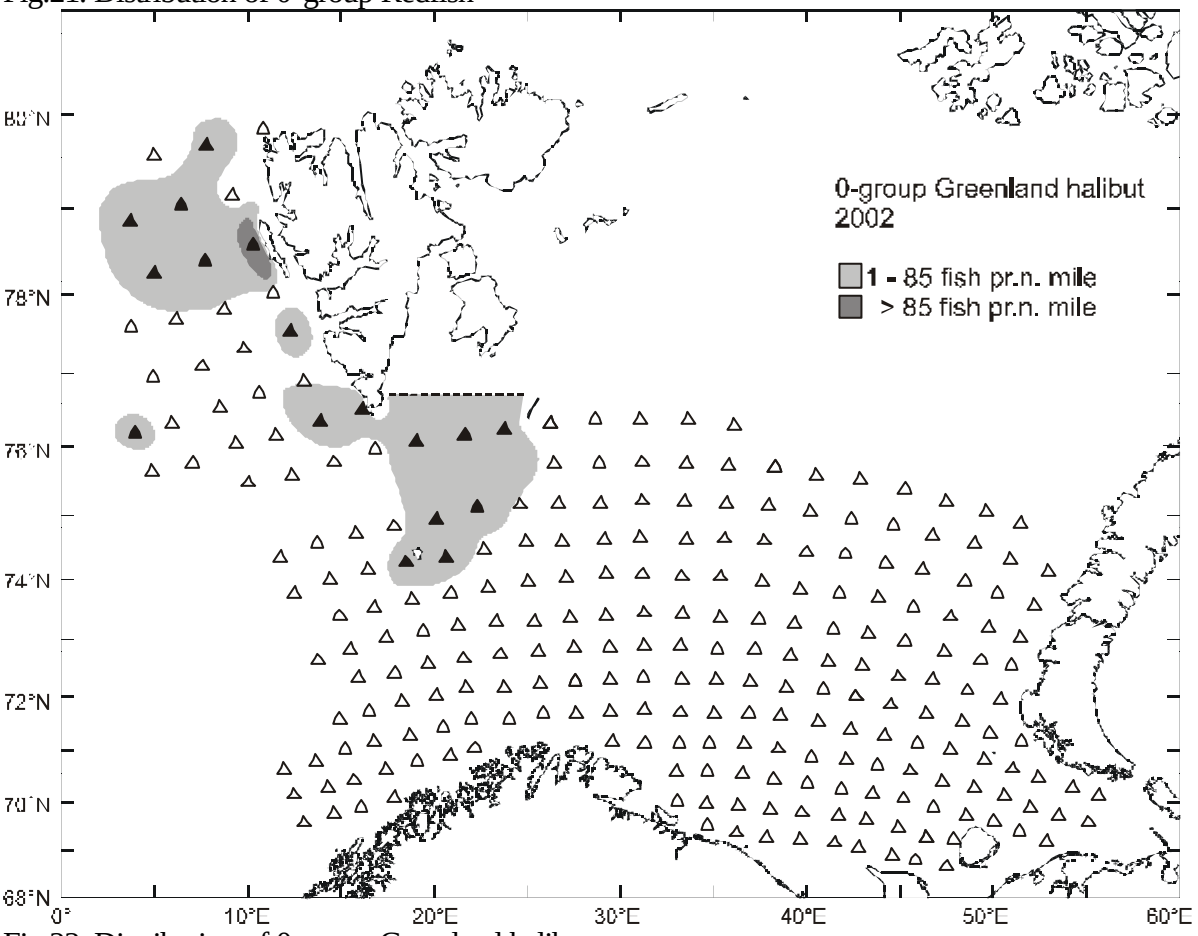

Fig.22. Distribution of 0-group Greenland halibut

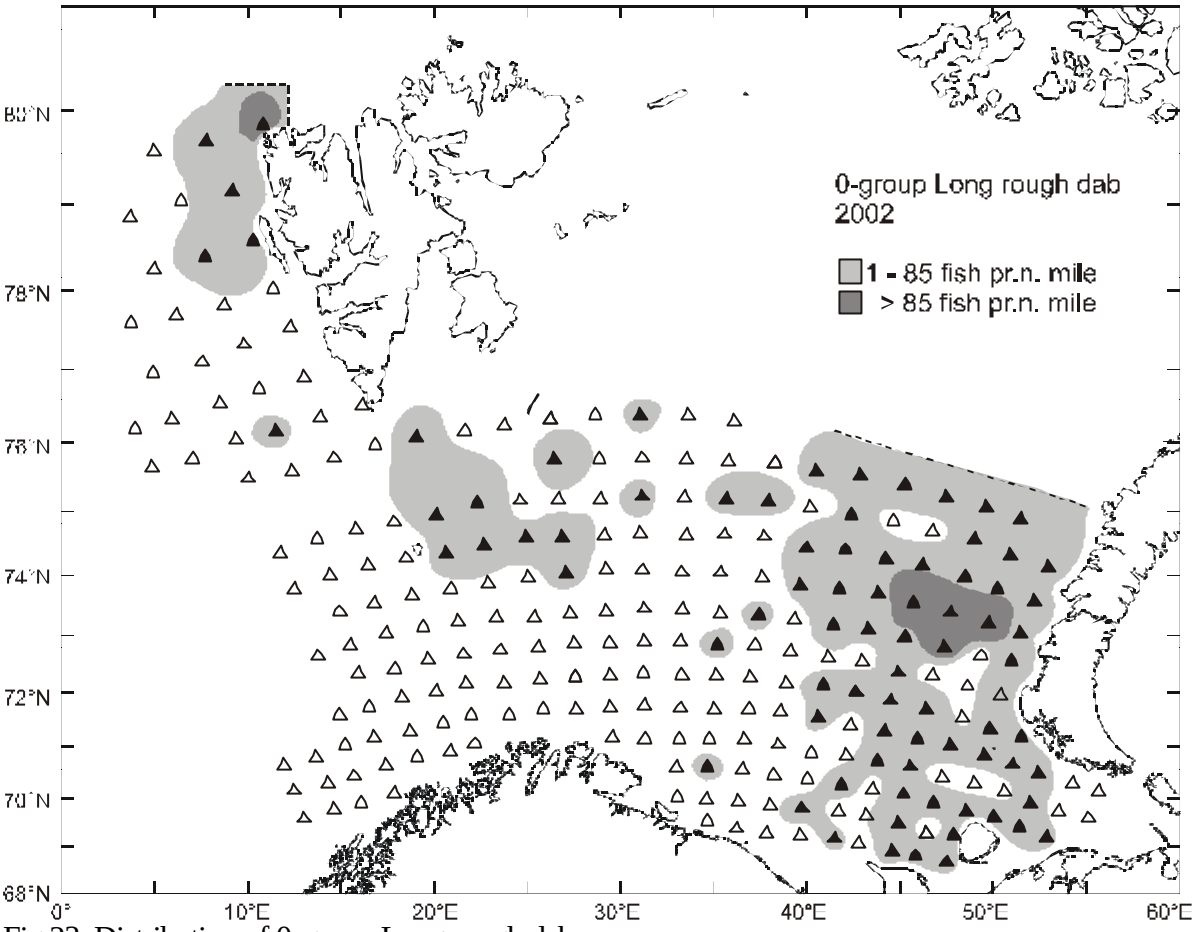

Fig.23. Distribution of 0-group Long rough dab

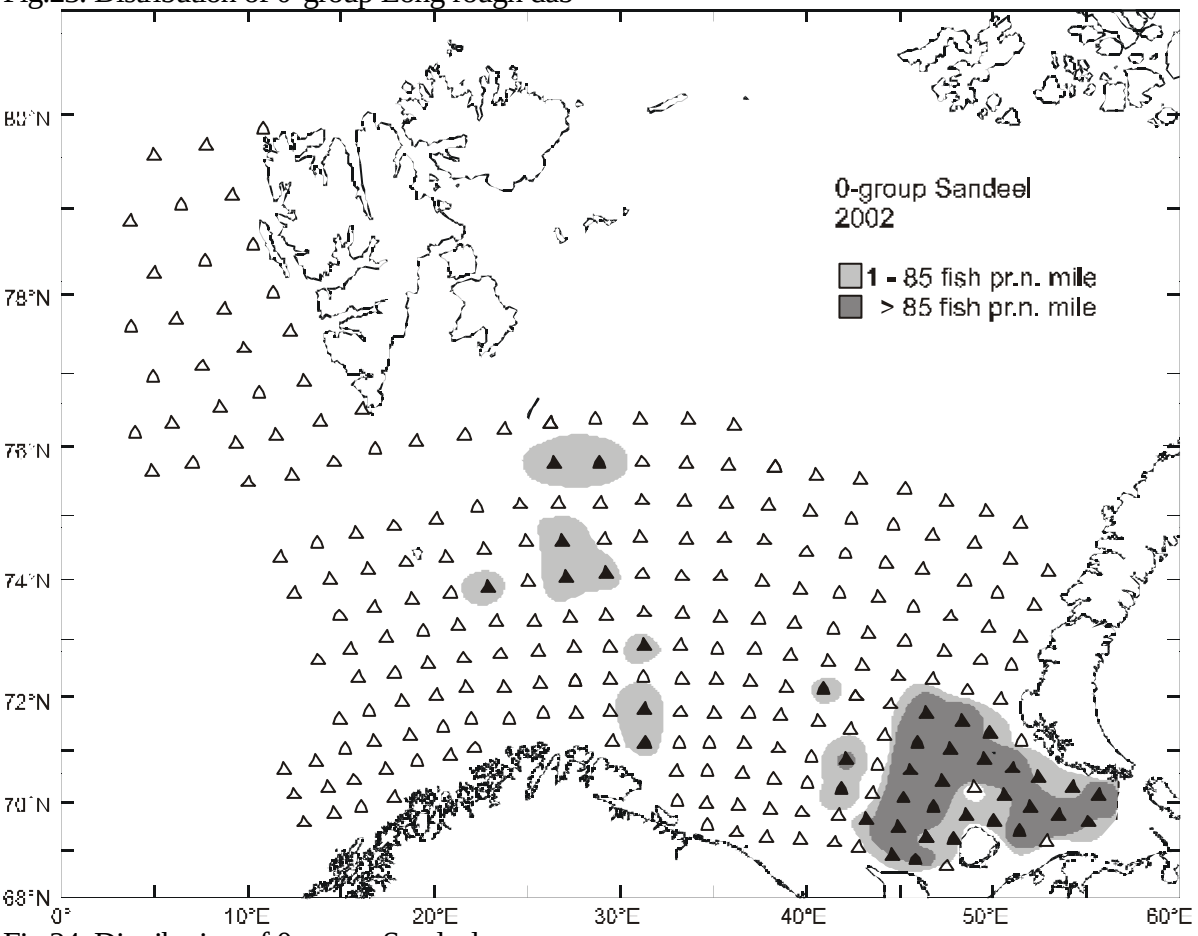

Fig.24. Distribution of 0-group Sandeel

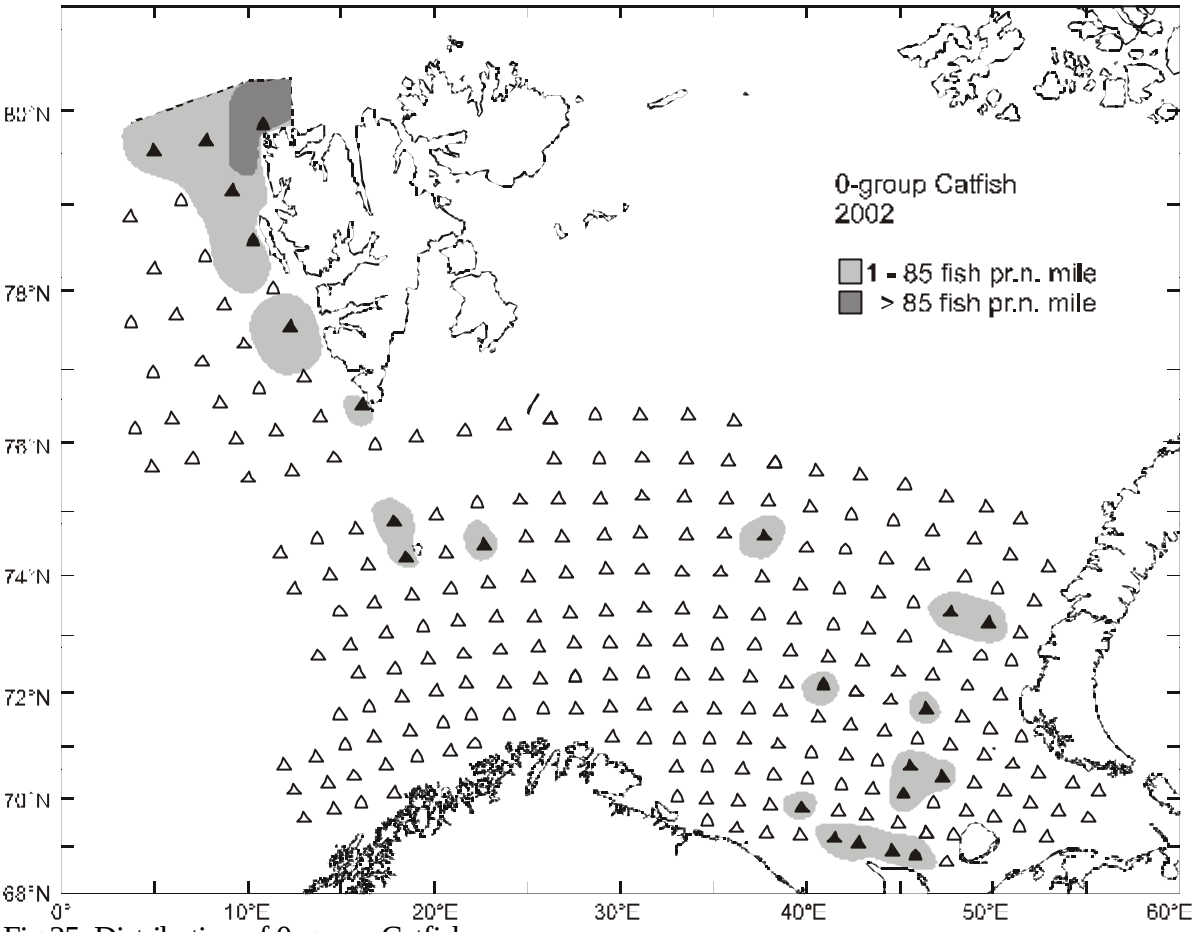

Fig.25. Distribution of 0-group Catfish

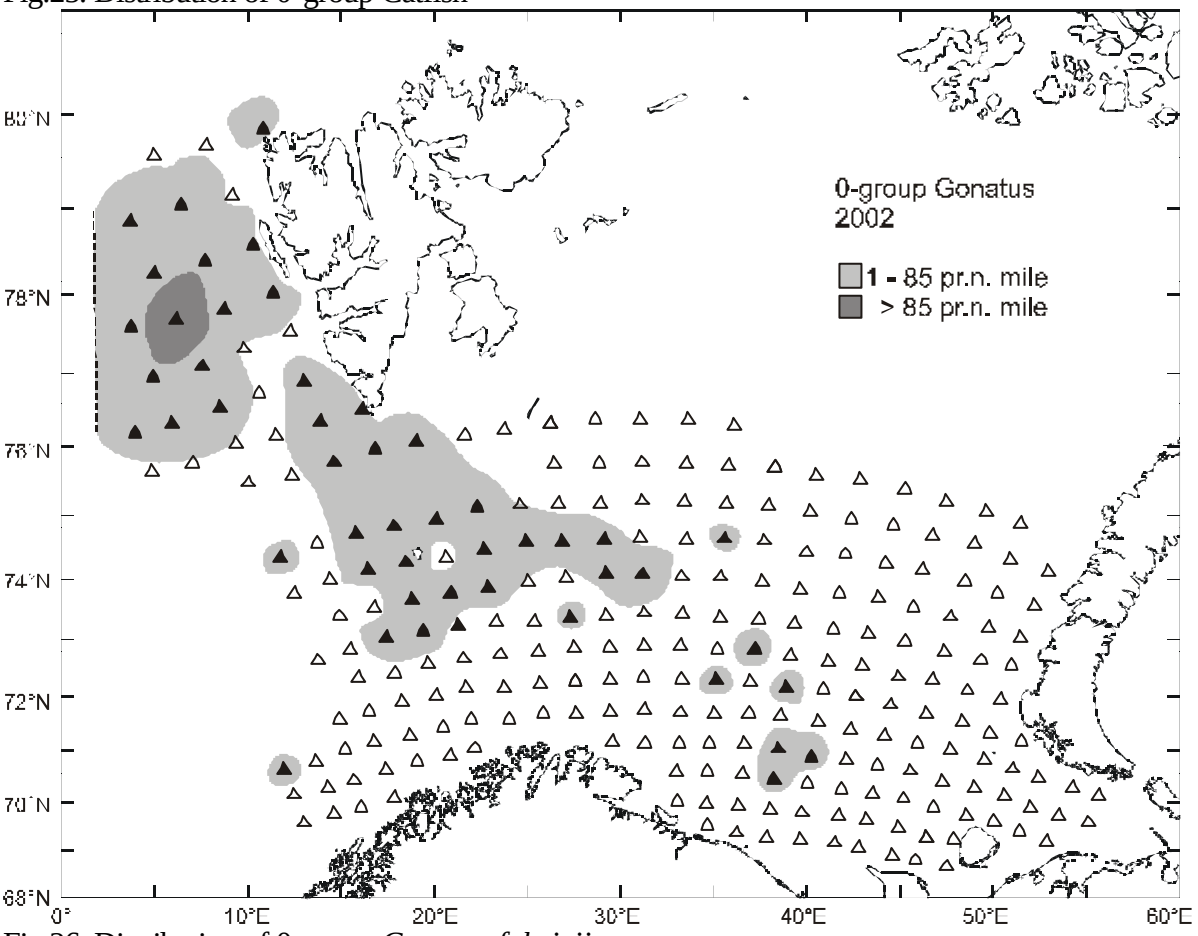

Fig.26. Distribution of 0-group *Gonatus fabricii*

APPENDIX

Research vessel	Participants
"AtlantNIRO"	O. Dolgaja, M. Kalashnikova, V. Mamylov, R. Maslova, T. Prokhorova, D. Prozorkevich (cruise leader), S. Ratushnyy, E. Timokhin, A. Trofimov, O. Vavilina, N.Zujkova
"Fridtjof Nansen"	I. Dolgolenko (cruise leader), Yu. Garbut, V. Kapralov, S. Kharlin, V. Kiselev, A. Lukmanov, S. Nemchinov, A. Nikiforov, S. Rusjaev, V. Sergeev, F. Shevchenko, T. Yusupov
"G.O.Sars"	B. Endresen, J. Erices, P. Fossum (cruise leader), O. Gullaksen, T. Haugland, T. Kolstad, H. Skogstrand, J. Træland, J. Wangensten, N. Ushakov
"J.Hjort"	P. Alvestad, J.R. Andersen, K. Gjertsen, R. Ingvaldsen (cruise leader), J. Johannessen, E.S. Meland, M. Mjanger, A. Røstgård, Ø. Østensen